DOCUMENT RESUME

ED 027 402 VT 007 726

By-Bergmann, Barbara R.; Kaun, David E.
Structural Unemployment in the United States.
Brookings Inst., Washington, D.C.
Spons Agency-Economic Development Administration (Dept. of Commerce), Washington, D.C.
Pub Date 67
Note-133p.
Available from-Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 (C46.2:UN2, $.65).
EDRS Price MF-$0.75 HC Not Available from EDRS.
Descriptors-*Business Cycles, Economic Factors, *Economic Research, Employment Patterns, Employment Problems, Employment Trends, *Labor Economics, Labor Force, *Labor Market, Models, *Unemployment
Identifiers-*Structural Unemployment

An attempt was made in this study to clarify the concept of structural unemployment, defined as the amount of unemployment (less minimum frictional and seasonal unemployment) that remains at the level of demand which is consistent with general price stability. A principle objective of the study was to examine in some detail the changes in the characteristics of the labor force during recent years in an attempt to estimate the target unemployment rate, that point where additional increases in demand would produce continuing inflation as a result of labor shortages. This was done by measuring the contribution to structural unemployment of skill shortages, regional demand patterns, and employability of youths and Negroes and by determining whether structural unemployment from these sources had changed since 1953. It was concluded that 3.7 percent is the upper limit of a band of unemployment rates within which the borderline of conditions of significant labor shortages is located. This includes a maximum estimate of 2.3 percent of the labor force as structurally unemployed. Detailed discussion of methods and computations is included. (ET)

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STRUCTURAL UNEMPLOYMENT
IN THE
UNITED STATES

U.S. DEPARTMENT OF COMMERCE
ECONOMIC DEVELOPMENT ADMINISTRATION

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STRUCTURAL UNEMPLOYMENT IN THE UNITED STATES

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for the

U. S. DEPARTMENT OF COMMERCE
Alexander B. Trowbridge, Acting Secretary

ECONOMIC DEVELOPMENT ADMINISTRATION
Ross D. Davis, Assistant Secretary
for Economic Development

The research described in this report was initiated with the financial support of the Area Redevelopment Administration and concluded with additional support from the Economic Development Administration. The statements, findings, conclusions, and recommendations in this report are solely those of the principal investigators and do not necessarily reflect the views of the Economic Development Administration.

FOREWORD

The Public Works and Economic Development Act of 1965 provides for a continuing research program to determine the causes of unemployment, underemployment and underdevelopment.

This study by the Brookings Institution offers not only a definition of structural unemployment, but also an estimate of the lowest unemployment rate that can be achieved without causing substantial inflation. The information developed in the study should be helpful to anyone concerned with the problem of unemployment.

The sections dealing with unemployment in the lagging areas of the country and unemployment based on race, age and sex should be of special benefit to those of us working in the Federal economic development program.

Ross D. Davis

Ross D. Davis
Assistant Secretary of Commerce
for Economic Development

INTRODUCTION

The maintenance of a low unemployment rate has long been a major goal of economic policy, but the achievement of this goal has not been easy. One factor that restrained the use of vigorous policies to promote high employment was the fear of inflation. Some believed that much of the unemployment in the late 1950s and early 1960s was "structural unemployment" which would not respond to the stimulus of general fiscal and monetary policies. While this question was debated at length among official policymakers and professional economists, little empirical work has been done to provide evidence on the seriousness of the structural unemployment problem.

In this study, Barbara R. Bergmann and David E. Kaun define structural unemployment and attempt to measure both its absolute size and recent changes in the number of persons involved by age, sex, and racial groups and by region. They also provide an estimate of the target unemployment rate that could be achieved through fiscal and monetary policies without creating substantial continuing inflation as a result of shortages in the supply of labor.

The bulk of the work for this study was completed during a period when the unemployment rate was about 5 percent, and when estimates of the size of the structural component ranged up to 100 percent. While the fall in the unemployment rate has been sufficient to prove the extreme structural unemployment estimates in error, the approach to lower levels has made it important to improve the methods of estimation. The higher the level of employment, the more crucial it is to be able to judge how close the economy is to the target unemployment rate. The methods developed by the authors, as well as their conclusions, will be particularly helpful in this connection.

The authors wish to express their appreciation to Mrs. Evelyn P. Fisher who acted as research assistant during the entire project and prepared the tabular material in this report. They are also grateful to Edward F. Denison and

Bert G. Hickman for their detailed and constructive criticisms. Others who read the manuscript and made helpful comments were Otto Eckstein, R. A. Gordon, Myron L. Joseph, Edward D. Kalachek, George L. Perry, and Albert E. Rees. The study was prepared in the Economics Studies Division, which is under the direction of Joseph A. Pechman, who contributed to the development of the project and assisted in the preparation of the final report.

The project was undertaken with the financial support of the Economic Development Administration, formerly the Area Redevelopment Administration. The authors wish to acknowledge the encouragement and assistance of Edward K. Smith, Deputy Assistant Secretary of Commerce for Economic Policy, who helped organize the original project when he was Chief of the Economic Analysis Division of the Area Redevelopment Administration, and Benjamin Chinitz, Deputy Assistant Secretary of Commerce for Economic Development.

The views expressed in this monograph are the authors' and are not presented as the views of the Economic Development Administration or of the officers, trustees, or staff members of the Brookings Institution.

Robert D. Calkins
President

May 31, 1966
The Brookings Institution
1775 Massachusetts Avenue, N.W.
Washington, D. C.

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CHAPTER 1

BASIC ISSUES IN STRUCTURAL UNEMPLOYMENT

The aim of this monograph is to measure structural unemployment. Definitions are by their nature somewhat arbitrary, but a definition of structural unemployment should have at least three characteristics. (1) It should be consistent with the meaning attached to the term in professional and relevant popular discussion. (2) It should clarify the policy alternatives and their implications. (3) It should be operational -- i.e., it should provide a basis for selecting the type of empirical evidence needed to measure structural unemployment.

> *In this study structural unemployment is defined as that amount of unemployment (less minimal frictional and seasonal) which cannot be removed by monetary and fiscal policy without creating substantial continuing inflation (as opposed to one-shot, nonrepeatable price rises) deriving directly from shortages of labor*.

This definition focuses on the determination of a target unemployment rate to be achieved by monetary and fiscal policy, and on the constraints to action imposed by the "structure" of the labor market. The location of a target rate is always important, but it is particularly important when demand is high and there is danger of overshooting the mark. Surprisingly, the methodology for determining the proper target for aggregate demand in view of the "structure" of the labor market has received little attention, despite numerous pronouncements on the subject by government bodies, private organizations, and scholars.

DETERMINANTS OF THE TARGET UNEMPLOYMENT RATE

The target unemployment rate must be greater than zero for two reasons. First, the characteristics of the labor force and the nature of employment opportunities create frictional, seasonal, and structural unemployment. (This study is concerned primarily with these characteristics.) Second, high employment rates are associated with undesirable economic effects that restrict the freedom of the monetary and fiscal authorities to maintain a high level of demand.

Frictional Unemployment

Frictional unemployment is associated with the time required to match workers with existing jobs. Suppose a worker becomes unemployed just as a new job which he will eventually fill opens up. He will be unemployed for some period of time because he will not find the opening immediately. The job search may be leisurely when the unemployment rate is low; when unemployment is high, he may be tempted to accept a "non-optimal" offer. Clearly, the amount of frictional unemployment is a function of the level of aggregate demand as well as the relationship between job seekers and job vacancies.

It is not possible to separate the frictionally unemployed from those who are unemployed for other reasons. However, it is possible to estimate the level to which unemployment would decline if structural and seasonal problems were eliminated and if demand were to rise to a level beyond which employment would not increase. This level is defined as "frictional" unemployment, and we shall discuss its approximate magnitude in the last chapter of this monograph.

The number of frictionally unemployed depends on labor turnover, the number of new entries to the labor force, and the average time required to match up vacancies and job seekers. Changes in frictional unemployment would alter the monetary and fiscal target, even if structural unemployment as defined earlier remained unchanged. This problem, which has been raised by those who assert that productivity increases have been accelerating, is dealt with later in this chapter.

Seasonal Unemployment

Seasonal unemployment refers primarily to a lack of synchronization in the short run between entries into a state of unemployment and exits from that state. In a static economy with only frictional and seasonal unemployment, entries and exits to unemployment during the course of a year should be equal.1/

As both seasonal and frictional unemployment must be subtracted from the target unemployment to arrive at structural unemployment, an estimate of seasonal as well as frictional unemployment is required. Seasonal unemployment is fairly easily derived from data prepared by the Bureau of Labor Statistics.

1/ Seasonal unemployment as measured includes workers who are temporarily laid off and who do not find it worth their while to find new jobs. Although not defined as unemployed in the United States, such persons may well be counted as unemployed because of the unemployment insurance arrangements.

Components of Structural Unemployment

Inflation would occur if aggregate demand were pushed beyond the point at which only frictional and seasonal unemployment remained. Prices rise in such circumstances because of shortages of the means of production, in particular, pervasive and widespread shortages of labor.

Shortages of labor that are sufficiently large and widespread to cause a continuing inflation may appear when unemployment exceeds the levels designated earlier as frictional and seasonal. This phenomenon occurs when the characteristics of the labor force are usually not identical with the characteristics needed to fill the job vacancies. In practice, when labor is scarce, persons who were formerly considered incapable of filling certain jobs will be hired and will perform more or less satisfactorily. Nevertheless, the perfect homogeneity of the labor force -- an implicit assumption of macroeconomic theory -- is as much of a fiction as the alleged rigidity of job requirements.

Structural unemployment may be divided into four categories:

1. Workers who are complementary with (i.e., whose labor must be combined with) some other unobtainable factor. The factor in short supply can be other workers or capital goods or raw materials. The bottleneck created must be significant and pervasive (or the resulting inflation will not continue), and of a type that cannot be relieved in the reasonably short run by substitutions induced by relative product and factor price changes. Unemployment among the unskilled and those with low educational attainment is structural unemployment of this type.

2. Unemployed who refuse, or are unable, to move to geographic areas where there is demand for workers with their qualifications. This type of structural unemployment is usually associated with the so-called "depressed areas;" however, intercity transportation problems may also be partly responsible for high unemployment rates as, for example, among ghettoized urban Negroes.

3. Workers whose marginal productivity at current prices is lower than the lowest wage they are free, or willing, to accept. The inability to pay a sufficiently low wage may arise because of legal minima or because workers refuse to accept wage rates corresponding to their marginal productivity. Any minimum money wage is eroded in real terms by inflation, so that unemployables by this definition may become employable if the money minimum wage does not keep pace with the price level. One might say that an individual is permanently unemployable only when society will never allow the "real" minimum wage to drop below his productivity.

4. Workers who are not hired because of age, race, sex, or other characteristics, even though their productivity is greater than or equal to the wage.

Full Employment

The term "full employment" should be reserved for that state of the economy in which the labor market has reached "optimality." Accordingly, the term will not be used in this monograph to refer to an economy in which unemployment consists only of frictional, seasonal, or structural unemployment. This will be referred to as a state of "full demand." Full employment will be reserved for labor markets in which the costs of any remaining measures to reduce unemployment exceed their benefits.

Inhibitions to Raising Demand

Structural unemployment has been defined in terms of a target unemployment rate that avoids pervasive labor shortages leading to continuing inflation. In fact, undesirable phenomena may show up long before pervasive labor shortages appear:

First, as demand is raised, there may be bursts of inflation due to isolated shortages of labor that are correctable by relative price changes. Such self-correcting inflationary bursts should be distinguished from inflations that can be corrected only by reducing the general level of demand. Policy makers may, of course, refuse to tolerate even a one-shot rise in prices; but, the additional unemployment over and above the target rate produced by such a policy should not be regarded as structural.

Second, elements of cost-push may appear even in the absence of excess demand. As unemployment declines, unions may insist on larger wage settlements, and management may show less determination to resist these demands; prices in oligopolistic industries will rise; and prices of commodities with inelastic supply curves and income-elastic demand curves (e.g., imported raw materials) may also increase.

Third, the demand stimulus may create or intensify balance-of-payments problems. This will occur even in the absence of general price increases if imports are income-elastic.

The definition adopted in this monograph would exclude from structural unemployment the unemployment added when the brakes are applied or further stimulus abstained from in the absence of pervasive labor shortage for such reasons as balance-of-payments problems or cost-push phenomena. The term "structural" in structural unemployment will be reserved for imbalances in the "fine anatomy" of the supply and demand for labor. This is not meant to suggest that it is never in the national interest to stop stimulating demand short of that unemployment rate which is structural as we have defined it (plus minimal frictional and seasonal). But if restraints are applied in such circumstances, it is confusing to call the extra unemployment "structural," since this usage of the term tends to place the responsibility for the unemployment on the characteristics of the labor force. If the problem is not related to these characteristics and it is widely understood to be unrelated to them, the monetary and fiscal authorities are likely to be less inhibited in promoting an appropriate level of demand.

Distinguishing "Structure of Unemployment" from "Structural Unemployment"

The "structure of unemployment" is the array of unemployment rates for individual racial, age, skill groups. It is natural to assume that structural unemployment exists among labor force groups with high unemployment rates, but this assumption is not necessarily correct. The incidence of unemployment is never perfectly even, and it may vary through time. In fact, group unemployment rates generally move together in a more or less systematic way - usually falling together when aggregate demand rises and rising together when demand contracts.

There is a temptation to consider the "structure of unemployment" to be undesirable in some sense if there is a large dispersion in group rates and to associate such dispersion with structural unemployment.

However, the "structure" changes because unemployment rates for some groups are more sensitive to changes in demand than others. For example, if Negro unemployment rates drop 2 percentage points for every 1 percentage point drop in the white rate, the "structure of unemployment" will "improve" (i.e., rates will become more alike) with sufficient increases in aggregate demand.

Thus, the "structure of unemployment" at any single point in time, especially when demand is low, cannot be used directly to guide policy. High unemployment rates for youths, for example, have often been erroneously interpreted to mean that many youths are unemployable.

To measure structural unemployment, it is necessary to eliminate the effect of the business cycle on the "structure of unemployment" and to determine how the structure has changed secularly.2/ Only in this way is it possible to establish a target unemployment rate that would be consistent with price stability.

Although the "structure of unemployment" changes as demand changes, structural unemployment, as defined here, does not. It does not make any sense to say that "The 1964 tax cut was a big success and structural unemployment has disappeared as a result." It makes sense to say "The tax cut was a big success: overall unemployment rates have declined, and the structure of unemployment seems improved because some of the highest rates declined rapidly. Structural unemployment has not

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2/ An analysis of the structure of long-term unemployment along these lines is given in Appendix A.

changed - it is not now, and never was, as large a number as some people believed."

An Alternative Definition of Structural Unemployment

A definition of structural unemployment substantially similar to ours, but differing in detail, has been proposed by Richard G. Lipsey.[3] He postulates the existence of a curve relating the rate of changes of prices and the rate of unemployment. Such a curve is similar to the "Phillips Curve" which relates the rate of changes in wage rates to the unemployment rate.[4]

Lipsey identifies "demand deficient" unemployment as the amount of unemployment that can be removed within the constraint of an "acceptable" rate of change in the price level; he then divides the remaining unemployment between structural and frictional. Structural unemployment is defined as the amount of unemployment that can be removed without further inflation through changing the structure of the economy by measures whose benefits exceed their costs.

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[3] Richard G. Lipsey, "Structural and Deficient-Demand Unemployment Reconsidered," in Arthur M. Ross (ed.), Employment Policy and the Labor Market (University of California Press: 1965), pp. 210-55.

[4] A. W. Phillips, "The Relation Between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom, 1862-1957," Economica, Vol. 25 (November 1958), pp. 283-99.

This definition has the minor demerit of including "unemployables" in frictional unemployment. Its major defect is that it lumps all kinds of inflation together, as does the Phillips Curve. A further weakness of the Phillips Curve approach is its failure to differentiate between conditions that cause once-for-all changes in the price level and those that result in a continual increase in prices. In measuring structural unemployment, we focus directly on labor market phenomena, rather than on prices that may rise from causes other than labor shortages.

Determining the Target Unemployment Rate

In principle, it is possible to distinguish between isolated labor shortages that can be corrected by relative price changes and pervasive labor shortages that cannot be corrected in this way; in practice, the distinction is extremely difficult to make. The method employed here is to examine in detail recent changes in the characteristics of the labor force that may be expected to contribute to structural unemployment -- its skill composition, regional distribution, and distribution by age, sex, and race.

Our strategy is conservative. We begin with a year in which aggregate demand was high but not excessive, in the sense that labor supply appeared to be adequate in all sectors. We then inquire whether changes in labor supply or demand since then have increased any of the components of structural unemployment as defined earlier.

The year 1953 has been selected as the "golden age" base year. In that year, the average unemployment rate (adjusted to current definitions) was the lowest in the postwar period -- 2.9 percent of the labor force.[5] On a seasonally adjusted basis, the rate reached a monthly low of 2.4 percent in August of that year, when an upper turning point in the business cycle was reached. Thus, the average unemployment rate for the entire year was somewhat higher than the rate that might have been achieved had prosperity been sustained. The significant characteristic of 1953 from the standpoint of this study is that the economy did not suffer from generalized shortages of labor, although there was considerable overtime work in the early months. However, prices were stable on the average even in the early months.

The President summed up the performance of the American economy in 1953 as follows:

> Perhaps never before in their history have the American people come closer to realizing the ideal of high and expanding employment, without price inflation, than in 1953.[6]

Our task is to decide whether recent changes in the nature of the supply and demand for labor are responsible for the poor employment performance since 1953. The primary data are the unemployment rates of various groups in the labor force. For example, after allowing for the effect of changes in aggregate demand, unemployment rates for Negroes and

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5/ Economic Report of the President (January 1966), Table C-20, pp. 232-33.

6/ Economic Report of the President (January 1954), p. 11.

youths have risen relative to the unemployment rate for white prime age males (see Chapter 4). This finding creates a presumption that Negroes and youths have become somewhat less "employable" and therefore that the target rate has moved upward somewhat since 1953. More generally, the overall unemployment rate in a recent year is predicted from the computed relationship between rates for the less favored and most favored groups, on the assumption that the unemployment rate for white prime age males returned to its base-year value. Other evidence concerning employability is also evaluated to determine whether the observed trends in the unemployment rates of individual groups are likely to persist, accelerate, or be reversed.

This procedure is carried out -- with some variations in detail -- for the various skill groups in Chapter 2, for regions in Chapter 3, and for race-age-sex groups in Chapter 4. In Chapter 5, the separate estimates are combined into one overall estimate of the target rates. Chapter 5 also provides an estimate of the amount of seasonal and frictional unemployment which must be subtracted from the target rate to obtain an estimate of structural unemployment.

THE STRUCTURAL ADJUSTMENT MECHANISM AND THE NATURE OF THE RESULTING INFLATION

The nature of the inflation resulting from labor market reactions to increases in demand must be clearly identified in a study of structural unemployment. The degree of inflationary bias in the economy depends on the characteristics of the supply and demand for labor and the relative ease with which initial maladjustments between supply and demand can be corrected.

In an economy in which labor, capital goods, and output are homogeneous (in other words, the ideal world of macroeconomic theory), any increase in demand beyond capacity output can be expected to produce a continuous upward drift of the price level. The rise in prices would continue so long as the excess demand was not corrected. Structural problems are added in the real world of differentiated output and factors. If demand exceeds supply anywhere in the economy, the degree and duration of the price rise would depend on how important an area of the economy was affected and how easily adjustments could be made. In general, the larger the area, and the less responsive the demand and supply of inputs and outputs to changes in relative prices, the greater is the price effect and the longer the time required to halt the inflationary process. For small sectors of the economy, especially where supply and demand are price-elastic, both the initial price increase and the secondary effects would be small.

An Example

These points can be illustrated in a hypothetical economy with two geographic areas. Assume that, during the last peak employment period, equal numbers of workers were employed in the two areas and unemployment consisted only of frictional unemployment in each. Suppose that tastes change and the product of Area A becomes more income-elastic or more popular at all income levels. The change in tastes will not be very important as long as there is slack in both sectors. As aggregate demand increases, unemployed workers will be rehired in both places. At some point, however, because of the increased taste for A's product, there will be no further labor available in A even though there is still slack in B. If aggregate demand and, hence, demand for A's product increase beyond this point, the economy must adapt to a "structural imbalance" between the supply and demand for labor. A number of such cases may be distinguished.

At one extreme, workers will move from B to A and employers in A will hire them; no price or wage changes may be required to absorb the new workers. This might occur if (1) the skill composition demanded and supplied in the two areas is approximately the same and (2) for workers in B, the move from unemployment to employment is sufficient inducement to move to A. In this case, the "structural imbalance" may be corrected without inflation.

At the other extreme, no workers in B can be induced to move or none will be accepted by employers in Area A. In this rather improbable case, the adjustment process consists entirely in the choking off of demand for A's goods by an increase in their relative prices. Any further increases in demand would require further price rises in A. This process need not continue to the point where B's unemployment is eliminated and no further inflation is required. On the other hand, induced price and wage increases in B may prevent the necessary change in relative prices; in these circumstances demand can be maintained at a higher level than A's capacity to produce only if prices continue to rise without limit. In this case, all of the unemployed in B are structurally unemployed.

In the intermediate case, prices and wages will rise somewhat in A. This will induce some workers to move and will improve the match between the structure of demand and the structure of supply. If there is a limit to the demand for B's output and some unemployed workers in B refuse to or are unable to move to A, these workers are "unemployable." There will probably be some (lesser) rise in prices in B's output and inputs, but the process should converge to a new equilibrium set of relative prices and to a new fixed price level for the economy as a whole.

These three cases illustrate a wide range of possibilities. Similar examples could be constructed for different industries, skills, races, etc.

If many prices are rigid or sticky in a downward direction, the upward price adjustments required to correct structural imbalances would not be offset by price reductions in other sectors. As a result, the average of all prices would rise when structural imbalances are eliminated.7/

The pace of an expansion is important in determining the amount of inflation which must be experienced to correct the underlying imbalance. If the pace is too rapid, temporary shortages of goods and labor may occur even though there may be considerable excess capacity in most sectors of the economy.

7/ A considerable share of the inflation in the late 1950s was attributed to this type of adjustment by Charles L. Schultze, Recent Inflation in the United States, Study Paper No. 1, Study of Employment, Growth and Price Levels, Joint Economic Committee, 86 Cong. 1 sess. (September 1959). Schultze's exposition is in terms of a change in the mix of demand for products, but we apply the same analysis to the mix of demand for different types of labor, the mix of demand by region, and so on.

One-Shot Inflationary Impulses

If the structural imbalances are confined to a limited area of the economy, the price rises may be expected to be of the one-shot rather than the continuing type.[8] An important weakness of the Phillips Curve approach is that it correlates rates of price change with the unemployment rate, implying that the basic causal relationship is between these two variables. But if most of the inflation produced by rising demand results from the one-shot price effects needed to relieve structural imbalance or if a given rate of unemployment persisted, the Phillips Curve would be a poor predictor of price change.

Structural imbalances tend to reveal themselves in periods of high demand. The imbalances developing during a depressed period are corrected in the succeeding prosperity period. To the extent that the corrections are one-shot in nature, the continuance of prosperity should be accompanied by a diminished rate of price increases as the secondary effects from the initial shocks died down. The price increases occurring during periods of rapid advance to sustainable levels without further inflation are clearly one-shot also.

We would expect then that, although the economy might have to go through some heavy inflationary weather on its approach to "full demand," the sea might be calmer after a period at the high level of activity. The maintenance of a high level of economic activity involves a higher rate of continuing inflation than a continuous low level, but the differences between the two situations are probably not as great as some of the empirically derived Phillips Curves imply. Such curves are based to a large extent on scatter diagrams of points representing rare and brief periods of structural adjustment at relatively low levels of unemployment during the past decade; few such points represent the rate of price advance in a period of continuous prosperity.

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[8] Each initial inflationary impulse will produce secondary inflationary effects via the input-output relationships in the economy, but the duration of this effect is probably brief.

Thus the rate of inflation at any given time is a poor indicator of the appropriate target unemployment rate for monetary and fiscal policy. The nature of the underlying labor market situation needs to be taken into account before such a judgment can be made.

PRODUCTIVITY AND THE STRUCTURE OF UNEMPLOYMENT

The unemployment literature has devoted considerable attention to the effect of productivity growth on employment.[9] The assertion is frequently made that widespread automation is around the corner, and that the rate of growth of productivity has increased or is expected to increase sharply very soon. A rise in productivity means that a given output can be produced with fewer workers, and perhaps with a different "mix" of skilled and unskilled workers. It is natural, therefore, to associate an accelerated rise in productivity with a heightened unemployment problem.

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[9] James W. Knowles and Edward D. Kalachek have discussed this at length in Higher Unemployment Rates, 1957-60: Structural Transformation or Inadequate Demand, Subcommittee on Economic Statistics, Joint Economic Committee, 87 Cong. 1 sess. (1961).

Effects on Employment

Productivity advance affects employment and its "structure" in three different ways:

1. Productivity advances change the mix of workers required for the production process.

Automation may increase the need for skilled labor and lower the need for the unskilled. The relation of this question to structural unemployment is discussed in Chapter 2. It is sufficient to note here that, while the changes for a firm or even an industry may be sudden and abrupt, long-run productivity changes for the economy as a whole are relatively smooth; they are usually not as abrupt as cyclical changes.

2. Productivity advances lower the number of workers needed to to produce a given output.

The simplistic view that productivity advances cause unemployment is correct only if the demand for goods and services does not increase in consequence of the productivity rise. Productivity growth does not necessarily insure the growth of the demand *ceteris paribus* necessary to keep the work force at a particular size. However, productivity-increasing improvements may also be capacity-increasing. Such improvements raise the minimum level of demand at which inflationary pressures would develop, increasing the magnitude of the fiscal and monetary stimulus that could be applied without fear of causing inflation.[10]

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[10] Structural unemployment as defined here might occur if demand increased

This aspect of the unemployment effect of productivity advance is not "structural" in nature since unemployment is not structural if created by a failure to keep necessary demand at the appropriate rate (allowing for whatever additional problems arise under heading 1).

3. Productivity advances create "frictional unemployment."

Increases in frictional unemployment are potentially important because they raise the target unemployment rate by a corresponding amount. But the effect is likely to be small. If productivity advances at an annual rate of p_o, in the course of a year total employment can diminish by a maximum of

$$E_o - E_1 = E_o - \frac{E_o}{1 + p_o} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

assuming no reduction in output. (E_o and E_1 represent the initial and subsequent level of employment.)

When productivity increases in a certain plant, the number of workers who will lose their jobs cannot be determined a priori. A doubling of productivity could result in the replacement of 10,000 workers by 5,000 new workers. Or the plant might raise its output and either retain all of its workers or hire new ones.

Frictional unemployment due to a constant rate of productivity advance at p_o per year will be

$$F_o = kw\left(\frac{p_o}{1 + p_o}\right)E_o \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

where w is the proportion of a year required to match the average displacee

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more than capacity in one or more industries.

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with a job opening (which, by assumption, opens up as soon as he is dismissed), k is a constant which is the ratio of workers dismissed because of productivity advances to the number of workers who would be dismissed if output remained unchanged and no new workers were hired. The value of k would be 1 if exactly as many workers were displaced as would be required to keep each plant producing the same output with the remaining part of the old work force.

If the rate of productivity advance changes to p_1 and unemployment from other causes and the size of the labor force are assumed to remain constant,

$$F_1 + E_1 = F_o + E_o \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (3)$$

and

$$E_1 = E_o \left(kw \frac{p_o}{1 + p_o} + 1 \right) / \left(kw \frac{p_1}{1 + p_1} + 1 \right) \quad \ldots\ldots\ldots (4)$$

and

$$\Delta U/F = \left(E_o - E_1 \right) / LF = \frac{E_o}{LF} \left[1 - \frac{kwp_o / (1 + p_o) + 1}{kwp_1 / (1 + p_1) + 1} \right] \quad (5)$$

If an economy starts from a position of 4 percent total unemployment and a 3 percent productivity advance, the rise in frictional unemployment due to the productivity increase is 0.81 if kw is assumed to have a value of 0.3. Each full percentage point added to the productivity rate adds about one-quarter of a percentage point to the frictional unemployment rate. Alternatively, doubling of the rate of productivity advance from 3 to 6 percent a year -- an extremely unlikely development -- would add only three-quarters of a point to the unemployment rate.

Thus, any likely increase in frictional unemployment resulting from an increase in the rate of productivity growth can hardly be of a magnitude worth considering.

Effects of Cyclical Changes in Productivity

Apart from its secular growth, productivity varies considerably in the short run with the level of employment.[11] On the one hand, productivity tends to rise with rising employment, as overhead and other employees who are retained regardless of the level of production are utilized more intensively in periods of high production. On the other hand, the quality of workers hired when production expands is probably below the average of those already employed, especially as the supply of labor diminishes. Productivity may also decline in periods of rapidly expanding business because there is less pressure for increased efficiency.

If average productivity falls off on balance as labor shortages begin to appear, costs and prices will rise. However, this may be a once-for-all price increase. The benefit of enduring such a price increase is the permanent increase in production by the new workers who are absorbed into remunerative activities plus the reduced social costs of the unemployment that was avoided.

SUMMARY

The term "structural unemployment" must be distinguished from the

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[11] T.A. Wilson and O. Eckstein, "Short-Run Productivity Behavior in U.S. Manufacturing," Review of Economics and Statistics, Vol. 46 (February 1964), pp. 41-54.

"structure of unemployment." The array of unemployment rates for individual racial, age, sex, and skill groups is the "structure" of unemployment. Unemployment rates for each group depend on the long-term demand for the skills of its members, as well as on the stage of the business cycle. The incidence of unemployment in some groups is particularly sensitive to the general level of business activity, so that inferences from the structure of unemployment during periods of depressed business activity exaggerate the structural unemployment problem.

"Structural" unemployment is defined in this study as the amount of unemployment -- less minimum frictional and seasonal unemployment -- that remains at the level of demand which is consistent with general price stability. More specifically, the target unemployment rate is the point where additional increases in demand would produce continuing inflation as a result of labor shortages.

The remaining chapters in this monograph examine in some detail the changes in the characteristics of the labor force during recent years in an attempt to estimate the target unemployment rate.

CHAPTER 2

STRUCTURAL UNEMPLOYMENT AMONG UNSKILLED WORKERS

In the postwar period different groups of workers have had markedly different unemployment rates. Of the 11 occupational groups in the Department of Labor classification, the three with the lowest unemployment rates (professional and technical, farmers and farm managers, and managers, officials, and proprietors) have also experienced the lowest percentage-point fluctuation. The less skilled white-collar groups do better in level and stability than the blue-collar groups; but the more highly skilled blue-collar workers -- craftsmen and foremen -- do better than the less skilled operatives and laborers (Table 2-1).

Unemployment rates for less skilled workers may be expected to be higher than the rates for skilled workers for a number of reasons. (1) As demand falls in a recession and unskilled workers are laid off, employers try to retain skilled workers with valuable experience in the work of the firm that employs them. (2) Some of the functions performed by the white-collar groups require "lumpy" inputs of labor. A firm may still require a girl at its switchboard and a secretary for the president even if low demand has reduced blue-collar employment substantially. (3) Industries with large numbers of blue-collar workers (manufacturing and construction) typically experience large demand fluctuations over the business cycle. (4) A skilled worker is competent to take an unskilled job after he is laid off; and so his probability of reemployment is greater than that of an unskilled worker. (5) Skilled workers are able to look for work in a geographically larger market -- in many cases, the entire country -- whereas the unskilled are confined to

TABLE 2-1. Unemployment Rates by Major Occupation Group: Annual Averages, 1947-64

(percent)

Year	Total Unemployed[a]	Experienced Workers				
		Professional, Technical and Kindred Workers	Farmers and Farm Managers	Managers, Officials, and Proprietors, except Farm	Clerical and Kindred Workers	Sales Workers
1947	3.6	1.9	.2	1.2	2.9	2.6
1948	3.4	1.7	.2	1.0	2.3	3.4
1949	5.5	1.9	.2	1.5	3.8	3.5
1950	5.0	2.2	.3	1.6	3.4	4.0
1951	3.0	1.5	.3	1.0	2.1	2.8
1952	2.7	1.0	.2	.7	1.8	2.5
1953	2.5	.9	.2	.9	1.7	2.1
1954	5.0	1.6	.4	1.2	3.1	3.7
1955	4.0	1.0	.4	.9	2.6	2.4
1956	3.8	1.0	.4	.8	2.4	2.7
1957	4.3	1.2	.3	1.0	2.8	2.6
1958	6.8	2.0	.6	1.7	4.4	4.0
1959	5.5	1.7	.3	1.3	3.7	3.7
1960	5.6	1.7	.3	1.4	3.8	3.7
1961	6.7	2.0	.4	1.8	4.6	4.7
1962	5.6	1.7	.3	1.5	3.9	4.1
1963	5.7	1.8	.5	1.5	4.0	4.2
1964	5.2	1.7	.5	1.4	3.7	3.4

- continued -

Source: U.S. Department of Labor, Manpower Report of the President, March 1965.

[a] Including persons with no work experience.

TABLE 2-1. (concluded)

(percent)

	Experienced Workers					
Year	Craftsmen, Foremen, and Kindred Workers	Operatives and Kindred Workers	Private Household Workers	Service Workers, Except Private Household	Farm Laborers and Foremen	Laborers, Except Farm and Mine
1947	3.8	5.1	3.4	4.7	2.7	7.5
1948	2.9	4.1	3.2	4.8	2.3	7.5
1949	5.9	8.0	5.2	6.1	3.9	12.9
1950	5.6	6.8	5.6	6.8	5.0	11.7
1951	2.6	4.3	3.8	4.3	2.1	5.6
1952	2.4	3.9	3.2	3.7	2.3	5.7
1953	2.6	3.2	2.5	3.6	2.5	6.1
1954	4.9	7.6	5.0	5.2	4.2	10.7
1955	4.0	5.7	4.1	5.8	3.7	10.2
1956	3.2	5.4	4.2	4.8	3.7	8.2
1957	3.8	6.3	3.7	5.1	3.7	9.4
1958	6.8	10.9	5.2	7.4	6.2	14.9
1959	5.3	7.6	4.8	6.4	5.1	12.4
1960	5.3	8.0	4.9	6.0	5.2	12.5
1961	6.3	9.6	5.9	7.4	5.7	14.5
1962	5.1	7.5	4.9	6.4	4.3	12.4
1963	4.8	7.4	5.2	6.2	5.5	12.1
1964	4.2	6.5	4.9	6.1	5.8	10.6

smaller geographic areas. (6) Turnover is higher for groups with larger proportions of women and youths, reflecting greater frictional unemployment. (7) Seasonal unemployment is higher among blue-collar than among white-collar groups.

In this chapter, we discuss the relationship between skill endowments of the labor force and structural unemployment, and attempt to determine whether there has been an increase in structural unemployment as a result of an increasing degree of mismatching between labor force skills and the demand for them.

RESPONSE OF SKILLED GROUPS TO DEMAND CHANGES

It is sometimes said that laborers have high unemployment rates because they do not have the educational and other qualifications necessary to secure professional jobs. This holds for the specific individuals who are blue-collar workers at any given time. But if they were all suddenly endowed with college educations, the unemployment rate among college graduates would rise sharply in the short run. It is misleading to assume, however, that unemployed laborers are necessarily structurally unemployed. The number of structurally unemployed cannot be inferred from unemployment rates when the economy is operating below full employment.

It may be worthwhile to state at this point a number of propositions that are widely accepted when explicitly stated, but are frequently contradicted in discussions of structural unemployment.

1. If demand rises toward capacity levels, the composition of the marginal demand for labor will be different from the composition of the average demand. This proposition holds for race and age as well as

occupational groups.

2. In an expansion of demand from below full-capacity levels to higher levels, the marginal composition of the demand for skills cannot be predicted from long-run trends in occupational composition.

3. A low unemployment rate for an occupational group does not necessarily imply that there will be a shortage for that type of labor if demand increases.

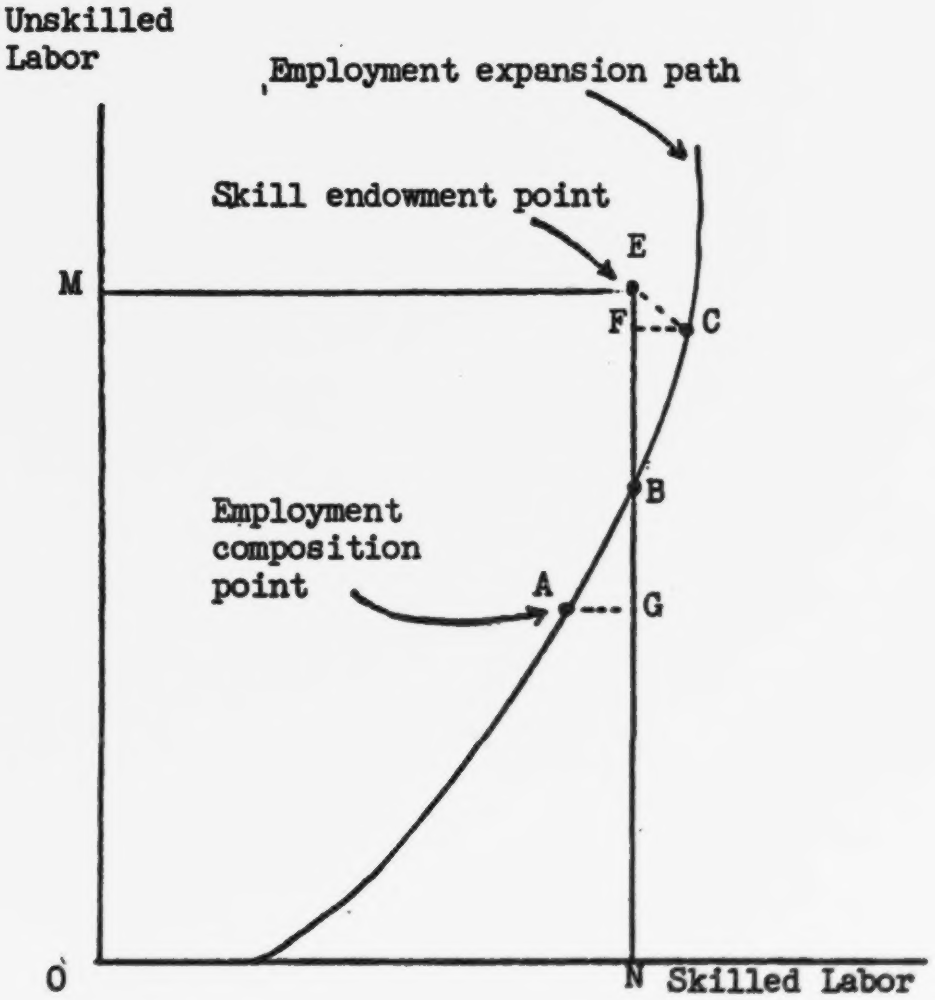
4. All shortages of labor do not necessarily create significant bottlenecks to higher production.

These points are illustrated in Figure 2-1, which shows how employment might respond to an increase in demand. The number of skilled workers is on the X-axis; the number of unskilled workers on the Y-axis. We make the simplifying assumption that the labor force consists only of these two types of workers. The curved line labeled "employment expansion path" shows the composition of employment as output increases. A rise in demand would push up employment of both kinds of labor, so that the employment expansion path moves upward to the right.

Let us define the short run as a period during which there are no changes in technology that permit substitutions of unskilled for skilled labor. Maximum output in the short run will be determined by the available amount of labor of both types. If it is further assumed that the supply of each type of labor is fixed, the size and composition of the labor force would be represented in the diagram by a single point such as E. This may be called the "skill endowment point."

On these assumptions, all feasible labor supply positions in the short

Figure 2-1


Unskilled Labor
Employment expansion path
Skill endowment point
E
M
F
C
B
Employment composition point
A
G
O
N
Skilled Labor

run would be within the rectangle ONEM.[1] Unemployment within each skill group is measured in the diagram by the distance of the actual employment position from the borders of the rectangle. As Figure 2-1 is drawn, an expansion of demand in the short run would raise the proportion of unskilled employed.

At A, overall unemployment is equal to unemployment among the skilled (AG in Figure 2-1) plus unemployment among the unskilled (GE in the diagram). However, the skill endowment point in the chart does not lie on the employment expansion path. Increasing aggregate demand will therefore push against a bottleneck at B where there is no unemployment among skilled workers (except for frictional, which is not shown in the chart). Total unemployment at B therefore consists entirely of unemployment among the unskilled, or BE. Assuming no other problems, BE may be regarded as the quantity of structural unemployment.

One method of expanding beyond B in an orderly way would be to move the skill endowment point, E, closer to the employment expansion path by retraining unskilled workers. Since retraining one person subtracts one from the unskilled labor force and adds one to the skilled, a retraining program will move the skill endowment point in a 45-degree direction from E toward C. If EF people are retrained, the skill endowment point reaches C. If demand is raised sufficiently to absorb the additional labor at C, BF unskilled workers will be hired as well as FC (=EF) retrained newly skilled workers. Thus, retraining may have a "multiplier" effect on employment provided there is enough additional demand.

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[1] If skilled workers can and would take unskilled jobs, then the area of possible supply positions is enlarged to include a 45-degree triangle with base ME.

Another method of adjustment to the situation in Figure 2-1 is a movement of the employment expansion path toward the skill endowment point. A shortage of skilled labor might raise its wage relative to that of unskilled labor, causing a shift of demand toward products with a relatively high component of unskilled labor. If such a shift occurred, employers would replace skilled by unskilled labor, thus shifting the employment expansion path upward to the left.

The employment expansion path shifts through time; but movements along this path can occur only in the short run. Since the proportion of skilled workers is rising over time, the employment expansion path is moving continuously downward to the right, as shown in Figure 2-2. This chart illustrates shifts in both the employment expansion path and the skill endowment position. There is no structural unemployment at E_1 on path P_1; whereas path P_2 does involve some structural unemployment since E_2 does not lie directly on P_2. Thus, employment of both types of labor is higher at A_2 than at A_1, yet there is some structural unemployment at A_2. In other words, structural unemployment of unskilled workers may increase even though unemployment rates of both skilled and unskilled decline and the drop for unskilled labor is relatively larger.[2]

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[2] Cf. R.A. Gordon, "Has Structural Unemployment Worsened"?, Industrial Relations, Vol. 3 (May 1964), p. 53, where the opposite view is maintained.

Figure 2-2

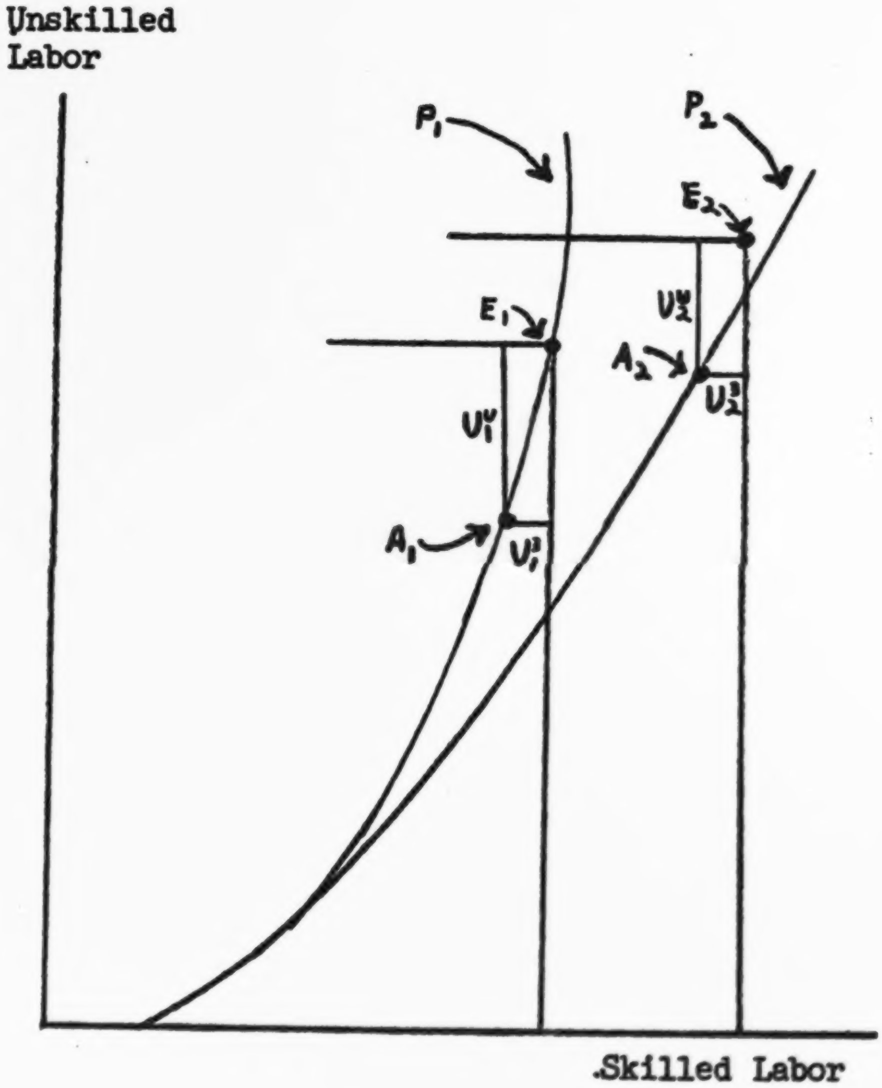

Unskilled Labor
P_1
P_2
E_2
E_1
U_2^u
A_2
U_2^s
U_1^u
A_1
U_1^s
Skilled Labor

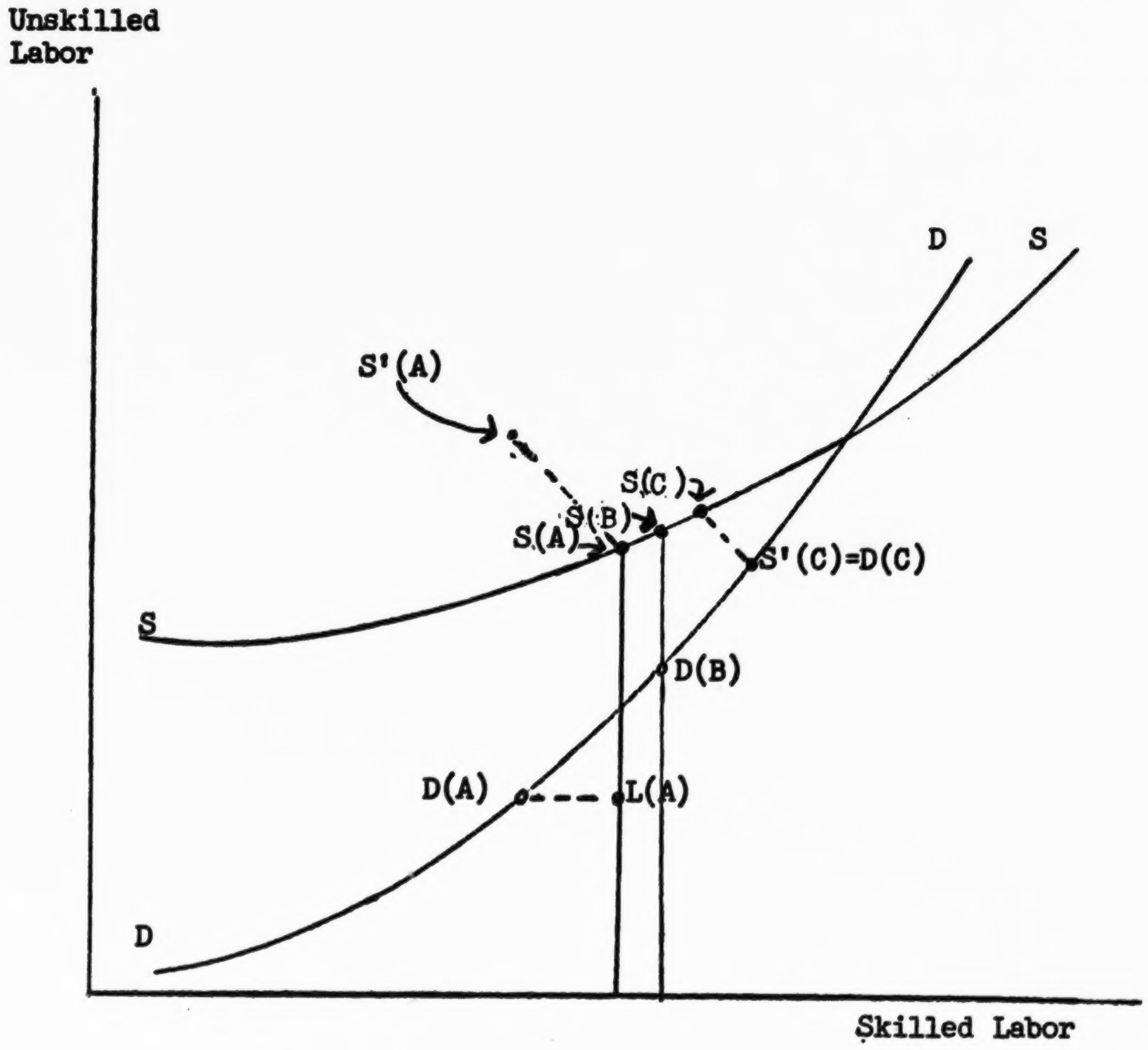
Figure 2-2 illustrates the essential point that structural unemployment can be determined only from the current slope and position of the employment expansion path. Changes in actual employment reflect changes in aggregate demand and in the composition of demand for labor; since the employment expansion path shifts over time, structural unemployment cannot be inferred directly from actual employment figures.

The analysis may be extended by assuming that, as demand increases, new entrants to the labor force add workers to both groups. The change for either group may come as shifts from one group to the other as well as from new entrants into the labor force.

Assume that the growth of demand over a single cycle takes the form indicated by DD in Figure 2-3, while the supply expansion path is represented by SS. In the long run, SS and DD shift as technological progress, number of youths, relative wages, and other factors affecting the labor market change. However, we restrict our attention here to short-run movements. With a gross national product of A, the amount and composition of the demand for labor is represented by the coordinates of D(A), while the labor force is represented by the coordinates of S(A). Thus there is L(A) minus D(A) unemployment of skilled and S(A) minus L(A) unskilled labor. As gross national product increases to B, labor demand moves to D(B) while supply moves only to S(B). At this point, a "skill bottleneck" would develop. Unemployment of skilled labor would be zero (abstracting, of course, from minimum frictional unemployment); but there would be S(B) minus D(B) unemployment of unskilled labor. In the absence of an adjustment mechanism, S(B) minus D(B) is structural unemployment.

If a skilled person would accept an unskilled job, then at A, points

Figure 2-3


Unskilled
Labor
Skilled Labor
D
S
S'(A)
S(C)
S(B)
S(A)
S'(C)=D(C)
S
D(B)
D(A)
L(A)
D

such as S'(A) on a 45-degree line to the upper left through S(A) are possible. Indeed, in periods of slack, many workers are not likely to be in the job for which they are most suited. Thus, the SS curve is the dividing line between feasible and nonfeasible labor force composition. To the extent that employers will, in time of shortage, relax skill requirements, the DD curve also can be thought of as an analogous dividing line.

Unskilled labor may be replaced by skilled labor through retraining programs, and changes in labor force composition brought on by retirements and entries. As already indicated, such changes shift the supply curve downward to the right, on a 45-degree line; for example, point S(C) may shift to S'(C) which lies on the demand expansion path at D(C). Full employment with no structural unemployment is possible if the point at which the SS and DD curves cross implies the same output for supply and demand. Under the Employment Act, the job of the federal government is to create the conditions under which this point is reached -- by shifting the supply curve and by raising aggregate demand to the appropriate level. As can be noted again from Figure 2-3, retraining creates a larger number of jobs than the number of retrainees, because of the assumed complementarity between skilled and unskilled labor.

Unemployment is determined by the shape of the demand and supply paths together with the movements along these paths as the gross national product increases. The demand path in Figure 2-3 supposes that relatively more unskilled than skilled labor is employed as gross national product grows and relatively less unskilled labor is employed as it declines.

SOME EMPIRICAL FINDINGS

To measure the short-run responses of unemployment to changes in demand in the United States, a series of regressions was fitted to quarterly employment and unemployment estimates by the broad occupations for which data are published by the Department of Labor.[3] In the case of employment, explanatory variables used were gross national product, time, and seven seasonal dummies. The results are presented in Table 2-2, which provides estimates of the postwar short-run elasticities of employment in various occupational groups with respect to gross national product. The elasticities generally conform with a priori expectations. The only surprise is the lack of a significantly positive elasticity for sales workers.

While colinearity between gross national product and the time path is a problem, the differences in the elasticities are suggestive. Employment of professional, technical, and managerial employees, on this evidence has a short-run elasticity of zero with respect to gross national product, with virtually all variation in this type of employment explained by the trend and seasonals. This result suggests that the rapid rate of secular growth in this type of employment provides little or no danger of skilled labor bottlenecks when demand is increased. The relatively high positive elasticities for operatives, nonfarm laborers and craftsmen and foremen are consistent with the hypothesis that the employment expansion path is almost vertical.

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[3] The published data were corrected for the changes in the definitions of employment and unemployment and for discontinuities in the series due to the introduction of new census benchmarks.

These equations were recomputed with a variable representing the order backlog as a percentage of gross national product (Table 2-3). The coefficient of this variable was strongly positive for the three occupations with the highest elasticities and negative or insignificant in other occupations, thus providing additional evidence to support our diagnosis of the slope of the employment expansion path.

To estimate the labor force reaction to changes in demand, regressions were also computed of unemployment against employment, time, unfilled orders as a percent of gross national product, and seasonal dummies (Table 2-4). Unemployment rather than labor force was used as the dependent variable to avoid using substantially the variable as dependent and independent. For workers who are immobile for occupational reasons and family breadwinners who cannot leave the labor force or get a job in some other skill category, the coefficient of employment in the equation explaining unemployment is negative. This means that unemployment decreases as employment increases for these groups. On the other hand, for those occupations whose members are flexible to accept less skilled jobs, the coefficient of the employment variable is close to zero or even positive, since frictional unemployment varies in proportion to employment and may be the major type of unemployment experienced by these groups.

Table 2-4 shows that the blue-collar occupations are immobile, with a rise in employment causing a fall in unemployment. For professional and managerial workers, a rise in employment seems to increase the labor force by more than the employment increase. While the computed magnitudes for these groups seem large, their sign reinforces the conclusion suggested by

Table 2-2. Relationship Between Employment and Gross National Product, By Occupational Groups, 1947-64[1]

Occupation	Elasticity of Employment with Respect to GNP (b_1)	Time Trend (b_2)	R^2	Quarterly Trend Rate of Growth[2]
Professional and technical workers	-.2206 (.0993)	.00555 (.00044)	.993	+.0129
Managers, officials, and proprietors	-.3219 (.1346)	.00229 (.00060)	.854	+.0053
Clerical workers	.1947 (.0925)	.00211 (.00041)	.981	+.0049
Sales workers	-.2978 (.1262)	.00263 (.00056)	.900	+.0061
Craftsmen and foremen	.7813 (.1281)	-.00215 (.00057)	.789	-.0050
Operatives	.6385 (.1119)	-.00205 (.00050)	.648	-.0047
Nonfarm laborers	1.2311 (.1518)	-.00476 (.00068)	.860	-.0110
Private household workers	-.2115 (.2274)	.00259 (.00102)	.848	+.0060
Service workers other than private household	-.1421 (.1149)	.00368 (.00051)	.977	+.0085
Farmers and farm managers	-.1361 (.1431)	-.00437 (.00064)	.988	-.0101
Farm laborers and foremen	-.0897 (.3746)	-.00260 (.00167)	.927	-.0060

[1] Relationship computed from the following equation:

$$\log \text{Employment} = a + b_1 (\log \text{GNP}) + b_2 (\text{time}).$$

Based on quarterly averages of monthly data, 1947-64.

[2] Antilog of b_2.

Note: Standard errors of the regression coefficients in parentheses.

Table 2-3. Relationship Between Employment, Gross National Product, and Unfilled Orders, By Occupational Groups, 1947-64[1]

Occupation	Elasticity of Employment with Respect to GNP (b_1)	Time Trend (b_2)	Elasticity of Employment with Respect to Unfilled Orders (b_3)	R^2	Quarterly Trend Rate of Growth[2]
Professional and technical workers	-.319	.00598	1.818	.993	+.0139
	(.127)	(.00056)	(1.487)		
Managers, officials, and proprietors	.059	.00063	-7.067	.885	+.0015
	(.156)	(.00069)	(1.817)		
Clerical workers	-.060	.00321	4.726	.985	+.0074
	(.108)	(.00048)	(1.258)		
Sales workers	-.050	.00156	-4.597	.910	+.0036
	(.155)	(.00069)	(1.816)		
Craftsmen and foremen	.270	.00007	9.495	.876	+.0002
	(.127)	(.00056)	(1.488)		
Operatives	.836	-.00291	-3.668	.676	-.0067
	(.139)	(.00062)	(1.627)		
Nonfarm laborers	1.044	-.00394	3.473	.866	-.0090
	(.193)	(.00085)	(2.255)		
Private household workers	-.095	.00208	-2.167	.849	+.0048
	(.294)	(.00130)	(3.436)		
Service workers other than private household	.040	.00289	-3.374	.979	+.0067
	(.144)	(.00064)	(1.684)		
Farmers and farm managers	-.025	-.00486	-2.062	.988	-.0111
	(.184)	(.00081)	(2.152)		
Farm laborers and foremen	.494	-.00513	-10.832	.931	-.0118
	(.471)	(.00208)	(5.498)		

[1] Relationship computed from the following equation:

log Employment = a + b_1 (log GNP) + b_2 (time) + b_3 (unfilled orders as a percent of GNP).

Based on quarterly averages of monthly data, 1947-64.

[2] Antilog of b_2.

Note: Standard errors of the regression coefficients in parentheses.

Table 2-4. Relationship Between Unemployment, Employment, and Unfilled Orders, By Occupational Groups, 1947-64[1]

Occupation	Rate of change of Unemployment to employment (d_1)	Time Trend (d_2)	Rate of change of Unemployment with Respect to Unfilled Orders(d_3)	R^2
Professional and technical workers	.0553 (.0138)	-3.600 (.825)	-.9972 (.1856)	.884
Managers, officials, and proprietors	.0024 (.0131)	-.589 (.258)	-1.2411 (.2545)	.641
Clerical workers	-.0675 (.0328)	4.791 (1.891)	-3.3517 (.5522)	.880
Sales workers	.0018 (.0290)	-.260 (.418)	-1.4595 (.3058)	.761
Craftsmen and foremen	-.3488 (.0542)	6.725 (1.503)	1.6182 (1.4810)	.807
Operatives	-.4734 (.0507)	8.899 (1.808)	-7.8266 (1.7630)	.797
Nonfarm laborers	-.2064 (.0714)	.352 (.893)	-4.4692 (1.1592)	.759
Private household workers	.0187 (.0214)	.163 (.233)	-1.1356 (.1978)	.725
Service workers other than private household	-.0147 (.0339)	1.839 (1.307)	-4.1185 (.5224)	.860
Farmers and farm managers	-.0048 (.0047)	-.216 (.215)	-.1147 (.0653)	.363
Farm laborers and foremen	-.0282 (.0165)	-.710 (.441)	-2.0257 (.3659)	.680

[1] Relationship computed from the following equation:

Unemployment = c + d_1 (employment) + d_2 (time) + d_3 (unfilled orders as a percent of GNP).

Based on quarterly averages of monthly data, 1947-64.

Note: Standard errors of the regression coefficients in parentheses.

the estimate of the low employment elasticity for skilled groups, namely that low unemployment rates in the high-skill, white-collar groups at low levels of aggregate demand do not necessarily indicate labor shortages at high levels of demand.

These findings fail to support hypotheses that short-run increases in demand are likely to meet with bottlenecks of professional, technical, and managerial workers. Low unemployment rates for these groups do not necessarily predict labor shortages when economic activity accelerates for two reasons: (1) demand for these groups is not highly sensitive to short-run changes in economic activity; and (2) on the supply side there is a strong positive labor force response to increases in employment. On the other hand, high rates of unemployment among blue-collar workers that occur when the economy is below the "full demand" level can be expected to diminish with increases in output, since unemployment responds strongly and there is relatively less labor force increase in response to changes in employment among these workers. While it might be argued that craftsmen, operatives and laborers are in some sectors complementary, the possibilities of substitution among the blue-collar labor forces is no doubt greater than the possibility of drawing the blue-collar labor force into white-collar occupations.

SUMMARY

Data for the postwar period indicate that increases in employment following a period of relatively low demand and output consist largely of increases in employment of the less skilled workers. The analysis suggests that structural unemployment among unskilled workers -- to the extent that it existed -- was due primarily to the shortage of skilled workers.

We conclude that the high unemployment rates of unskilled workers in recent years was due largely to the inadequacy of aggregate demand, and not to increased structural unemployment. Some of the unskilled may have been structurally unemployed, but such structural unemployment is caused by factors other than their lack of skills to participate in a modern industrial economy.

CHAPTER 3

REGIONAL UNEMPLOYMENT

The preceding chapter was concerned with structural unemployment attributable to heterogeneity of labor force skills. In this chapter we investigate the regional component of structural unemployment. Even if the skill composition of the demand for labor in the entire nation matched the skill composition of the total supply for all levels of aggregate demand, structural unemployment might exist because of regional mismatches of demand and supply. Structural unemployment can be avoided only if the potential supplies of labor are located at (or rapidly transferable to) the particular places where the demand for these services may be expected to occur.

Unemployment rates differ greatly among regions at all times. In some areas the unemployment rates move with the national average and at roughly the same level. In others the unemployment rate substantially exceeds the national average in recessions, but returns to it in the subsequent recoveries. Elsewhere, the rate varies cyclically, but always remains at higher or lower levels than the national average. In a few areas the rate seems to show little cyclical variation. Among all these patterns, structural unemployment due to regional imbalances may be expected to be found in areas with high unemployment rates even in times of general national prosperity.

As already indicated, structural unemployment due to skill heterogeneity occurs if expansion of demand beyond a certain point reveals shortages of important skill groups (after all possible upgrading) that cannot be filled by others without the necessary experience or education. Analogously, structural unemployment due to geographic heterogeneity occurs if expansion of demand beyond a certain point reveals a significant number of areas with labor shortages while there is substantial unemployment in other areas. In both cases further demand increases would increase production very little and would create a sustained inflation. Regional structural unemployment can be reduced or eliminated through the migration of workers from the depressed areas and relocation of industry in these areas.

Just as all the above-average blue-collar unemployment is not structural, all the unemployment in depressed areas cannot be regarded as structural. Almost all area unemployment rates contain a cyclical component. A rise in aggregate demand would not be spread evenly among geographic areas and among the various skill groups. Those areas with a high proportion of cyclically sensitive industries (steel, autos, etc.) benefit more than proportionately when demand rises.

Measurement of the regional component of structural unemployment is subject to the complication that demand expansions do not distribute the new employment by regions in roughly the same way. 1/ A rise in

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1/ This is also true of the distribution of additional employment by skill groups, but probably less so.

demand based largely on increases in the defense budget will have a considerably different impact regionally than one whose basis is an automobile boom, and the impact of an automobile boom will have a different regional impact than a construction or investment boom. This means that the amount of regional structural unemployment depends not only on the distribution of skills by region but also on the type of demand pressure which is assumed to bring about the state of full demand.

The empirical investigation in this chapter is designed to measure differential regional employment responses to cyclical increases in demand for the nation as a whole. The main emphasis will be on areas with persistently high unemployment over the whole cycle--precisely the areas where a residue of structural unemployment is most likely to remain after an expansion of demand. The occupational characteristics are examined to see whether the skill composition of the workers residing in these areas hinders economic recovery. An upper limit to the regional component of structural unemployment is calculated on the basis of these estimates. Finally, an attempt is made to measure the change in the regional component of structural unemployment since 1953.

RESPONSE OF "DEPRESSED" AREAS TO INCREASES IN DEMAND

Unemployment rates among regions would differ even if the economy were at "full employment," since differences in industry mix and labor force composition would create different proportions of frictional and seasonal unemployment. In periods of slack, the cyclical component of unemployment is higher in some areas than in others, so that regional structural unemployment cannot be determined directly by examining the high regional unemployment rates when average unemployment for the nation as a whole is high. Regional structural unemployment can be determined only after the national unemployment average is at or near the target rate and a substantial number of areas are at full employment. As a first step in measuring regional structural unemployment, this section examines the response of employment and unemployment to increases in demand in a number of labor markets that have been described as "depressed" at one time or another in the recent past. 2/

The labor markets analyzed in this chapter were selected on the basis of the level and persistence of unemployment rates. 3/ The areas

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2/ In theory it would be appropriate to consider all areas whose unemployment rate exceeded the full employment rate by even a small amount, since some of these areas may fail to show any improvement as the national unemployment rate fell. However, we shall confine our attention to areas showing higher unemployment rates than the national average in the early 1960s when the economy was below the full employment level.

3/ The unemployment rates given by the Bureau of Employment Security have been subject to some criticism. See J. E. Ullman, "How Accurate are Estimates of State and Local Unemployment?," Industrial and Labor Relations Review, Vol. 16 (April 1963), pp. 434-52. Also, President's Committee to Appraise Employment and Unemployment Statistics, Measuring Employment and Unemployment (U. S. Government Printing Office, 1962), Chap. 7. There is considerable discrepancy on a regional, state, and community basis between the BES figures and those obtained for the Census month April 1960, as given in the Census volumes. Furthermore, there is no obvious pattern to these discrepancies. The BES rates are high compared with the Census in areas experiencing relative declines in population (the Northeast), and the opposite is the case for areas of rapid population growth (the West). However, in both areas the BES rates are closer to those obtained in the monthly Current Population Survey than are the Census estimates. Thus, while it seems clear that there are errors in the estimates, it is difficult to determine how large these errors are, since we are without any absolute standard.

One approach might be to consider the CPS as the single best source of estimates of unemployment on the simple ground that these figures are obtained on a regular (monthly) basis by experienced enumerators working with a well chosen sample. On this assumption, the closest approximation to the CPS would be an average of the BES and Census rates, since for the areas of large discrepancy these latter two estimates bracket the CPS estimate.

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chosen had unemployment rates of 6 percent or more in at least 3 of the years 1958-63. (Of these 64 areas, 59 had more than 6 percent unemployment for 4 or more years, and 40 for 5 or more years.)

The data provide answers to the following questions: (1) What happened to employment and unemployment in the previously depressed areas during the recovery from the recession range of February 1961 through February 1965? (2) What was the relationship between national employment growth and employment growth in these areas? (3) Based on information obtained in answering the above, what might the employment and unemployment picture in these areas be if the national unemployment rate fell considerably further? [4]

Unemployment Rates in Depressed Areas, 1961 and 1965

In February 1965, the national unemployment rate (not adjusted for seasonal variations), excluding the depressed areas, was 5.5 percent. Of the original sixty-four areas chosen for study, twenty-five had achieved an unemployment rate equal to or less than 5.5 percent. Whether as a result of rapid employment growth and/or outmigration, these areas could no longer be considered depressed in terms of the unemployment rate. Regional structural unemployment, to the extent that it existed, was most likely to be found in the remaining 39 labor markets.

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[4] These calculations were made before the national unemployment rate fell below 4 percent early in 1966.

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After four years of economic growth uninterrupted by recession, the unemployment rates in a majority of the 39 areas were above 7 percent. There were 562,300 unemployed in these labor markets in February 1965, representing an unemployment rate of 6.7 percent. Of this total, the excess over 5.5 percent (average in the rest of the nation) was 103,000 (Table 3-1). This represented 4.4 percent of the unemployment in the nation's 150 major labor market areas. 5/

Area Employment Responses to Increases in National Demand

The changes in employment in depressed labor markets during periods of general economic expansion depend in part on the responsiveness of their industries to the demand stimulus. Unemployment will decline relatively more in those areas with industry mixes that are highly responsive to increases in total demand; if the expansion is vigorous and lasts long enough, unemployment in such areas might ultimately

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5/ As we have already indicated, we may be overlooking some areas that would not respond to further increases in aggregate demand. However, the number, if any, is not large. Only six areas with rates in excess of the national rate in February 1965 were not included in our group. These were Los Angeles, 6.1 percent; Sacramento, 7.3 percent; San Francisco, 5.8 percent; San Jose, 7.9 percent; New York, 5.9 percent; and Salt Lake City, 5.8 percent.

Table 3-1. Unemployment Rates in 64 "Depressed" Labor Market Areas 1958-63, February 1961 and 1965

(percent)

Labor Market Area	Unemployment rates (not seasonally adjusted) February 1961	Unemployment rates (not seasonally adjusted) February 1965
Group 1 a/	9.8	6.7
Mayaguez	12.3	15.9
Ponce	14.4	12.9
Stockton	14.4	11.1
Atlantic City	16.6	10.6
Fall River	11.8	10.5
Lowell	10.7	9.9
Fresno	14.1	9.5
New Bedford	12.6	9.1
Scranton	14.3	9.0
Huntington, Ashland	16.0	8.7
Wheeling	18.6	8.7
San Diego	8.1	8.4
Altoona	13.4	7.8
Duluth, Superior	12.4	7.8
Terre Haute	9.9	7.8
Wilkes-Barre, Hazleton	14.9	7.6
Charleston (W. Va.)	9.9	7.5
Lawrence, Haverhill	8.2	7.4
Spokane	11.3	7.3
Brockton	9.3	7.2
San Bernardino, Riverside, Ontario	8.6	7.2
Utica, Rome	9.5	7.1
Tacoma	9.8	6.9
Johnstown	21.4	6.6
Jersey City	8.5	6.5
Seattle	8.5	6.5
South Bend	13.0	6.5
Waterbury	10.0	6.5
Springfield, Chicopee, Holyoke	9.2	6.4
Newark	8.2	6.3
Paterson, Clifton, Passaic	8.5	6.3
Providence, Pawtucket	10.0	6.3
Beaumont, Port Arthur	8.7	5.9
San Juan	6.2	5.9
Bridgeport	9.0	5.8
Philadelphia	8.5	5.8
Erie	13.5	5.7
Hamilton, Middletown	11.0	5.7
Kansas City	8.7	5.6

-continued-

Table 3-1. (concluded)

Labor Market Area	Unemployment rates (not seasonally adjusted)	
	February 1961	February 1965
Group 2 b/	11.6	4.2
New Britain	11.5	5.5
Worcester	8.7	5.5
Buffalo	12.1	5.4
Muskegon, Muskegon Heights	11.6	5.3
Trenton	9.2	5.2
Syracuse	8.2	5.1
Corpus Christi	8.6	4.8
Pittsburgh	13.2	4.7
Asheville	9.4	4.4
Miami	6.8	4.4
Toledo	10.1	4.2
Allentown, Bethlehem, Easton	9.5	4.0
Canton	11.9	4.0
Lorain, Elyria	13.6	4.0
Chattanooga	8.0	3.9
Evansville	8.8	3.9
Louisville	9.1	3.8
Detroit	14.4	3.7
Birmingham	8.5	3.6
Gary, Hammond, East Chicago	9.4	3.6
Knoxville	9.0	3.5
York	7.6	3.5
Youngstown, Warren	12.8	3.3
Saginaw	10.7	2.3
Flint	18.3	2.0

Source: U. S. Department of Labor, Bureau of Employment Security.

a/ "Depressed" areas with unemployment rates in excess of the national average of 5.5 percent (not seasonally adjusted) in February, 1965.

b/ Areas which achieved unemployment rates equal to or less than 5.5 percent in February, 1965.

reach the national average. If the industry mix is not responsive to the cycle, general expansion will have relatively little effect on unemployment in the depressed areas. Structural unemployment is obviously relatively small in the former case, and large in the latter.

We have estimated the response of employment in each of the depressed areas to increases in employment in the nation as a whole by fitting the following equation to bi-monthly data for the period 1952-64:

$$E_i = AE^b(1 + r)^t \qquad (3.1)$$

where E_i is the local area employment, E is national employment, r is the trend rate of growth (or decline), and t is time. The least squares estimate of b in the logarithmic form of equation (3.1) gives an estimate of the elasticity of local area employment with respect to national employment. Table 3-2 gives the annual trend rate of growth as well as the employment elasticities for the depressed areas. In most cases the relationship between local employment and national employment as well as the time trend is statistically significant.

The values of both the time trends and the employment elasticities are of interest. In the areas which remain in the depressed group, only 15 (out of 38 for which the trend was computed) experienced a secular decline in employment after accounting for changes in national employment growth. Among the group of cities where unemployment rates went below the national rate in the recovery from the 1961 trough, 9 cities showed a secular decline in employment. In these latter cities, however, the employment elasticities are all quite high. It is in cities with a

Table 3-2. Annual Employment Trends and Responses to Changes in National Employment, Selected Labor Market Areas, 1952-64

Labor Market Area	Annual trend, percentage change in employment b/	Employment elasticity with respect to national employment b/
Group 1 a/	0.77	0.56
Mayaguez	-2.59	2.52
Ponce	0.80	0.71
Stockton	1.60	0.11
Atlantic City	2.08	-0.07
Fall River	-1.30	0.36
Lowell	0.22	0.33
Fresno	2.90	0.35
New Bedford	-0.79	0.56
Scranton	-1.02	0.64
Huntington, Ashland	-0.01	1.01
Wheeling	-0.99	0.69
San Diego	4.45	0.05
Altoona	-1.05	1.32
Duluth, Superior	-0.61	0.54
Terre Haute	-0.11	0.32
Wilkes-Barre, Hazleton	-1.59	0.88
Charleston (W. Va.)	-0.25	0.44
Lawrence, Haverhill	3.80	-0.14
Spokane	0.85	0.25
Brockton	1.04	0.36
San Bernardino, Riverside, Ontario	5.64	0.27
Utica, Rome	0.62	0.53
Tacoma	1.14	0.34
Johnstown	-1.70	1.05
Jersey City	n.a.	0.44
Seattle	3.77	-0.06
South Bend	-1.82	1.18
Waterbury	-0.17	0.84
Springfield, Chicopee, Holyoke	0.64	0.45
Newark	0.46	0.46
Paterson, Clifton, Passaic	2.69	0.42
Providence, Pawtucket	0.36	0.80
Beaumont, Port Arthur	4.07	-0.01
San Juan	2.63	1.05
Bridgeport	0.55	0.96
Philadelphia	0.92	0.12
Erie	-0.21	0.90
Hamilton, Middletown	0.83	0.78
Kansas City	1.28	0.31

-continued-

Table 3-2. (concluded)

Labor Market Area	Annual trend, percentage change in employment [b]	Employment elasticity with respect to national employment [b]
Group 2 [a]	0.60	0.83
New Britain	-0.52	0.99
Worcester	-0.19	0.47
Buffalo	-0.01	1.04
Muskegon, Muskegon Heights	0.08	0.86
Trenton	1.49	0.44
Syracuse	1.08	0.60
Corpus Christi	1.38	0.47
Pittsburgh	-0.92	0.89
Asheville	2.15	0.75
Miami	5.86	-0.06
Toledo	-0.35	0.75
Allentown, Bethlehem, Easton	0.54	0.46
Canton	-1.30	1.31
Lorain, Elyria	0.82	1.59
Chattanooga	0.36	0.60
Evansville	-0.43	1.34
Louisville	1.06	0.83
Detroit	-0.88	1.49
Birmingham	0.87	0.36
Gary, Hammond, East Chicago	n.a.	n.a.
Knoxville	0.44	0.76
York	0.79	0.60
Youngstown, Warren	-0.08	0.96
Saginaw	1.04	0.88
Flint	1.00	1.46

Source: U.S. Department of Labor, Bureau of Employment Security.

[a] For definition of Groups1 and 2, see footnotes a and b, Table 3-1.

[b] Based on equation (3.1)of text. For the regression coefficients, their standard errors, and R^2, see Appendix B.

declining secular employment trend and a low employment response to national increase in demand that serious unemployment problems are to be found. Several cities among those listed in Table 3-2 are in this category; all of them are small. 6/

As might be expected, the employment response as measured by the elasticities in Table 3-2 are generally higher in the cities that achieved lower than average unemployment rates in recovery from the 1961 trough. The unweighted average of elasticities for these cities is .83 as compared with .56 in the areas with continuing high unemployment. 7/

Estimated Structural Unemployment in Depressed Areas

The employment elasticities for the depressed areas provide a basis for estimating the order of magnitude of regional structural unemployment. The method begins with an unemployment rate at which the economy as a whole

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6/ For example, Fall River, New Bedford, Scranton, Wheeling, Duluth, Charleston, and Terre Haute all have negative trend values along with a low elasticity.

7/ The predicted unemployment increase for the 39 areas combined in response to a national increase in employment of 4.08 percent is 1.63 percent, implying a weighted elasticity of .40.

might achieve full demand. For this national rate, the employment elasticity equation is used to predict employment and unemployment in the depressed areas. The amount of regional structural unemployment is the amount of unemployment in excess of the postulated national average in those areas that continue to have higher-than-average unemployment at full demand.[8]

The calculations were made for assumed full demand unemployment rates of 3 and 4 percent, on the assumption that full demand lies in this range.

The calculations were made as follows: we first determined how much additional employment would have been necessary to bring the seasonally adjusted national unemployment rate down to 3 (or 4) percent as of February 1965. By multiplying this percentage by each area's employment elasticity we derived the predicted seasonally adjusted employment for the area as of February 1965.[9] We then adjusted the labor force in each area to allow for the increase in labor force participation because of greater job availability (but made no allowance for reductions in labor force due to outmigration). Finally, the excess unemployment above 3 (or 4) percent was calculated. This excess over 3 (or 4) percent is one estimate of the amount of regional structural unemployment.

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[8] Depressed areas with average unemployment rates higher than the national average were included in making this calculation. This means that the cut-off point is somewhat above the average that would be observed in the absence of regional structural unemployment.

[9] The area employment and labor force figures are not adjusted seasonally in the figures provided by the Bureau of Employment Security. These

As of February 1965 seasonally adjusted labor force and employment for the nation were 75.1 million and 71.3 million, respectively, representing an unemployment rate of 5 percent. If we assume no labor force change, an employment total of 72.8 million would be required to reduce unemployment to 3 percent. This implies an increase of 2.1 percent over February 1965 employment. However, there is considerable evidence to suggest that the size of the labor force is positively related to employment.[10] In other words, as employment increases the labor force

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figures were adjusted as follows:

$$E^{*}_{t} = \frac{\sum_{k=t-11}^{t} E_k}{12} + (E_{t-12} - E_t)\,\frac{11}{24}$$

A similar formula was used to adjust labor force data.

[10] See A. Tella, "The Relation of Labor Force to Employment," *Industrial and Labor Relations Review*, Vol. 17 (April 1964), pp. 454-69, and Kenneth Strand and Thomas Dernburg, "Cyclical Variation in Civilian Labor Force

also increases; consequently, a greater than 2.1 percent increase in employment would have been required to reduce the unemployment rate to 3 percent.

The work of Tella and Strand-Dernburg suggests that a labor force response to employment of close to .5 exists for the recent years. Thus, assuming that for every increase of 100 in employment the labor force increases by 50, an increase in employment of 4.08 percent over actual employment would have been required to reduce the February 1962 unemployment rate to 3 percent.11/ This results in a labor force of 76.5 million,

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Participation," Review of Economics and Statistics, Vol. 46 (November 1964), pp. 378-91. In a critique of several studies on labor force flexibility, J. Mincer argues that the statistical techniques utilized have resulted in overestimating labor force sensitivity. "Labor Force Participation and Unemployment," Prosperity and Unemployment, edited by R. A. Gordon and Margaret S. Gordon (Wiley, 1966).

11/ The estimate of 4.08 percent is derived from the equations:

$$LF_1 = LF_0 + .5\Delta E$$

$$LF_1 - E_0 - \Delta E = .03\ LF_1$$

where LF_1 is the predicted labor force, LF_0 is present labor force, E_0 is present employment, and ΔE is increase in employment required to with employment of 74.2 million.

The product of 4.08 percent times each area's employment elasticity gives the predicted percentage increase in employment over what actually occurred for each area if the national unemployment rate had reached 3 percent. This percentage increase multiplied by the area's actual employment (seasonally adjusted) gives the hypothetical increase in number employed in each area. We have assumed that the labor force adjustment in each area was the same as for the nation as a whole (as described in the preceding paragraph). The resulting figures are given in Table 3-3.

The calculations indicate that, if the national unemployment rate had been 3 percent in February 1965, employment in the 39 depressed labor markets would have been 1.6 percent higher than actual employment. The unemployment rate for these areas would have been 4.7 percent. The excess of unemployment over 3 percent is 147,000; this represents 31.8 percent of the total unemployment in the depressed areas, and 7.7 percent of unemployment in all the 150 major labor market areas. (For the 4 percent national unemployment rate, the excess unemployment represented 18.0 percent of total unemployment in the depressed areas, and 4.3 percent of unemployment in the major labor market areas.)

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reach 3 percent unemployment. Our use of what may well be a high estimate of labor force sensitivity probably does not bias the results greatly since a lower estimate would reduce *both* employment growth and labor force growth.

Table 3-3. Actual and Hypothetical Labor Force Magnitudes for 39 Depressed Areas, February 1965

(seasonally adjusted)

Labor force and components	Actual, February, 1965	Hypothetical, assuming national full demand unemployment rate of:	
		4 percent	3 percent
Employment	7,898,600	7,964,600	8,027,700
Labor force	8,360,200	8,393,200	8,427,500
Unemployment	461,600	428,600	399,800
Unemployment rate	5.5%	5.1%	4.7%
Number of unemployed accounted for by rate in excess of national average	41,800	82,900	147,000
Estimated regional structural unemployment as a percent of total actual unemployment in 150 labor market areas	---	4.3%	7.7%
Estimated regional structural unemployment as a percent of total actual unemployment in 39 labor market areas	---	18.0%	31.8%

Thus, if it is assumed that structural unemployment is distributed proportionately among the 150 major labor markets and the rest of the nation, structural unemployment due to regional factors was on the order of 4 to 8 percent of total unemployment.

The calculations suggest that employment in most labor market areas will respond well to increases in demand over the level actually achieved in February 1965. However, it is clear that the response will be less satisfactory in a number of areas. In these labor markets, between 18 to 32 percent of the unemployment can be considered structural, that is, not subject to reduction by increases in the national level of demand.

INDUSTRY MIX IN DEPRESSED AREAS

In February 1965, the unemployment rate for all nonagricultural industries was 5.6 percent, but individual industries ranged from a low of 2.2 percent in finance to a high of 16.7 percent in construction. Obviously, differences in industry mix will have a significant effect on the level of economic activity in different areas. Area unemployment rates will differ even at full employment as a result of such differences.

The regional effect of industry mix may be approximated by applying the national industry unemployment rates to the industry mix in each of the 39 most "depressed" labor market areas. The calculation was made by weighting the national industry unemployment rates in February 1965 by the 1960 percentages of total employment in each industry in each area. (Census data for 1960 provide the latest breakdowns of area employment by industry.) The predicted area unemployment rates, based on their mix of industries, are given in Table 3-4. Fifteen areas have predicted rates equal to or less than the national rate of 5.6 percent, and few of the remaining areas exceed the national average by a substantial amount. Only 9 areas had predicted rates in excess of 5.8 percent.

A more dynamic aspect of this question is whether employment growth is affected by industry mix. As the employment elasticities imply, most of the 39 areas responded weakly to national growth in employment. Is this response attributable to industry mix?

In this connection, it is useful to distinguish between basic (mining and manufacturing) and nonbasic (all other) industries; the former have national markets, while the latter depend largely on local or regional markets.[12] Local industrial area response to growth in demand may be assumed to follow national trends in the basic industries. But it would be incorrect to make the same assumption for the nonbasic

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[12] Our classification is admittedly arbitrary, but this approach does not lend itself to greater refinement. Gallaway defined "secondary employment" as employment in mining, construction, and manufacturing. Lowell E. Gallaway, "Some Aspects of the Economic Structure of Depressed Areas," Land Economics, Vol. 34 (November 1959), p. 340.

Table 3-4. Predicted Unemployment Rates Based on National Industry Unemployment Rates Compared with Actual Unemployment Rates, Selected Labor Market Areas with High Unemployment Rates, February 1965

(percent)

Labor Market Area	Unemployment rates (not seasonally adjusted) Actual	Predicted
Group 1 [a]		
Mayaguez	15.9	6.4
Ponce	12.9	6.2
Stockton	11.1	5.6
Atlantic City	10.6	6.0
Fall River	10.5	5.8
Lowell	9.9	5.9
Fresno	9.5	6.0
New Bedford	9.1	5.7
Scranton	9.0	5.7
Huntington, Ashland	8.7	5.8
Wheeling	8.7	5.9
San Diego	8.4	5.7
Altoona	7.8	5.4
Duluth, Superior	7.8	5.8
Terre Haute	7.8	5.7
Wilkes-Barre, Hazleton	7.6	5.8
Charleston (W. Va.)	7.5	5.8
Lawrence, Haverhill	7.4	5.6
Spokane	7.3	5.7
Brockton	7.2	5.8
San Bernardino, Riverside, Ontario	7.2	5.8
Utica, Rome	7.1	5.4
Tacoma	6.9	5.6
Johnstown	6.6	5.7
Jersey City	6.5	5.4
Seattle	6.5	5.6
South Bend	6.5	5.5
Waterbury	6.5	5.6
Springfield, Chicopee, Holyoke	6.4	5.6
Newark	6.3	5.5
Paterson, Clifton, Passaic	6.3	5.7
Providence, Pawtucket	6.3	6.0
Beaumont, Port Arthur	5.9	6.1
San Juan	5.9	6.1
Bridgeport	5.8	5.6
Philadelphia	5.8	5.6
Erie	5.7	5.6
Hamilton, Middletown	5.7	5.7
Kansas City	5.6	5.6

Source: U. S. Department of Labor, Bureau of Employment Security.

[a] For definition of Group 1, see footnote a, Table 3-1.

sectors. Employment in trade, services, and other local industries will probably be more stable in areas with relatively stable basic industries than in areas with the more unstable basic industries. For example, the cyclical fluctuation of employment in durable manufacturing is proportionately larger than in nondurable manufacturing. Thus, areas depending heavily on durable manufacturing are likely to have a bigger pickup in trade as demand increases than those depending on nondurable manufacturing. Similarly, areas whose base is in mining would be unlikely to have a substantial pickup of trade and other nonbasic industries during a cyclical upswing because of the long-term downward trend in mining. Accordingly, we assume that the local employment response in nonbasic industries is proportionate to the rise in employment in the basic industries.

National employment increased by 11.5 percent from February 1961 to February 1965, with an increase of 9.6 percent in basic industries and 12.3 percent in nonbasic industries. We obtain what may be called the "warranted growth" for each area in the following manner: the percentage increases, February 1961-February 1965, for each basic industry (mining and all two-digit manufacturing) are applied to the area's industry mix.13/ This gives the "warranted growth" in basic industries. It is assumed that

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13/ The area industry mix is derived from U S. Bureau of the Census, Census of Population, 1960: Detailed Characteristics by State.

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the growth in nonbasic employment is just sufficient to maintain the area basic-nonbasic ratios existing as of the Census date, April 1960.[14] The "warranted growth" in basic industries can then be taken to be the "warranted growth" in total area employment.

For all areas combined, the "warranted growth" is 10.4 percent compared with a national rate of 11.5 percent. The estimates for the individual areas range from 2.1 percent in Beaumont-Port Arthur to 16.6 percent in South Bend; in 12 areas the "warranted growth" rate is less than 8.0 percent (Table 3-5).

These results suggest that, while relatively few areas in the country had high unemployment rates in February 1965 because of an adverse selection of industries, industry mix had a substantial impact on relative growth in employment by areas during the expansion of February 1961-February 1965.

LABOR FORCE SKILLS IN DEPRESSED AREAS

The preceding section found that employment in a number of the nation's labor market areas responds sluggishly to increases in national

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[14] Since for the entire nation nonbasic employment increased more than basic employment, our assumption implies that this difference is all the result of differential area increases, with areas containing more nonbasic employment having relatively larger employment increases.

Table 3-5. Comparison of "Warranted" and Actual Growth in Employment in Selected Labor Market Areas with High Unemployment, February 1961-February 1965

(percent)

Labor Market Area	Growth of total employment	
	Actual	Warranted
Group 1 [a/]	8.0	10.4
Mayaguez	-4.7	7.1
Ponce	2.7	3.5
Stockton	-4.7	7.5
Atlantic City	19.1	10.0
Fall River	-4.5	10.3
Lowell	14.4	9.3
Fresno	-3.2	5.7
New Bedford	1.3	10.4
Scranton	0.0	8.8
Huntington, Ashland	7.3	11.4
Wheeling	-2.4	9.7
San Diego	-0.6	14.5
Altoona	3.1	6.5
Duluth, Superior	-3.1	2.5
Terre Haute	36.1	6.8
Wilkes-Barre, Hazleton	6.8	7.4
Charleston (W. Va.)	-1.1	7.2
Lawrence, Haverhill	8.4	8.1
Spokane	-0.2	9.3
Brockton	9.3	8.3
San Bernardino, Riverside, Ontario	17.7	11.6
Utica, Rome	-2.3	12.3
Tacoma	6.9	9.0
Johnstown	9.7	7.8
Jersey City	-4.2	10.3
Seattle	19.8	12.8
South Bend	16.5	16.6
Waterbury	4.0	14.9
Springfield, Chicopee, Holyoke	8.4	11.4
Newark	6.0	10.8
Paterson, Clifton, Passaic	13.8	10.9
Providence, Pawtucket	8.2	10.4
Beaumont, Port Arthur	73.2	2.1
San Juan	33.2	7.6
Bridgeport	6.3	13.8
Philadelphia	3.2	9.8
Erie	10.6	14.6
Hamilton, Middletown	3.9	13.7
Kansas City	17.7	10.9

-continued-

Table 3-5 (concluded)

Labor Market Area	Growth of total employment	
	Actual	Warranted
Group 2 [a/]	11.7	13.0
New Britain	6.8	16.4
Worcester	8.4	11.8
Buffalo	8.4	12.4
Muskegon, Muskegon Heights	-1.4	15.2
Trenton	11.5	12.2
Syracuse	4.7	11.3
Corpus Christi	13.7	5.1
Pittsburgh	4.6	12.9
Asheville	11.6	8.0
Miami	4.9	9.8
Toledo	36.4	12.4
Allentown, Bethlehem, Easton	7.0	11.5
Canton	13.3	14.2
Lorain, Elyria	17.3	15.8
Chattanooga	12.4	9.4
Evansville	21.5	10.7
Louisville	9.2	8.2
Detroit	15.8	15.7
Birmingham	5.0	11.9
Gary, Hammond, East Chicago	7.6	13.4
Knoxville	11.8	9.0
York	29.3	10.0
Youngstown, Warren	8.9	15.8
Saginaw	11.6	14.9
Flint	43.7	17.3

Source: U. S. Department of Labor, Bureau of Employment Security.

a/ For definition of groups, see footnotes a and b, Table 3-1.

demand. Is this sluggish response the result of insufficient supplies of skilled labor in these areas?

Information on job vacancies by area would give a direct measure of the relative demands for skilled labor, but such data are not available. Accordingly, the relative shortages of skilled labor must be determined indirectly on the basis of area distributions of employment and unemployment rates by occupational groups, educational achievement of heads of households in different areas, and migration behavior of different occupational groups.

Detailed occupational data are available only for a limited number of depressed areas. For the most part we have relied on the 1960 Census of Population, which provides occupational data for Standard Metropolitan Statistical Areas with a population of 250,000 or more. These 24 areas are included in our original area selection shown in Table 3-1.[15] Thus, to the extent that any conclusions are drawn, the limitation of the sample to larger labor market areas must be kept in mind.

Level of Education

Data on the educational levels attained by heads of households in the 24 areas are given in Table 3-6. For the most part, the skilled labor

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[15] Five of these areas, Chattanooga, Miami, Pittsburgh, Syracuse, and Worcester, were not among the 39 areas with continued high unemployment as of February 1965.

TABLE 3-6. Education and Skill Composition in Selected Labor Markets, 1960

Labor Market	Educational Level of Heads of Household (Years)					Percent of Total Labor Employed As			Actual Employment/ Predicted Employment		
	Less Than 8	High School	1-3 College	4 College	At Least High School	Professional & Technical	Managers & Proprietors	Craftsmen & Foremen	Professional & Technical	Managers & Proprietors	Craftsmen & Foremen
Beaumont, Port Arthur	28.6	24.8	10.2	8.2	43.2	11.2	9.2	11.8	1.11	1.04	1.21
Bridgeport	18.7	22.6	8.5	9.4	40.5	12.1	7.3	17.2	1.08	0.94	0.95
Charleston (W. Va.)	24.7	22.2	8.8	10.1	41.1	13.1	8.2	15.2	1.22	0.92	1.10
Chattanooga	31.3	19.6	7.6	8.0	35.2	9.9	9.3	13.5	0.95	1.09	0.97
Duluth, Superior	14.8	25.3	9.0	8.0	42.3	11.4	11.5	16.9	0.90	1.30	1.18
Erie	16.4	27.5	7.6	7.6	42.7	11.0	9.5	15.9	0.95	1.19	1.07
Fresno	24.8	21.8	11.0	8.5	41.3	9.8	14.4	11.6	0.95	1.70	1.01
Huntington, Ashland	25.8	20.9	7.8	6.5	35.2	10.5	9.5	16.0	0.94	1.10	1.06
Jersey City	25.4	17.8	5.4	4.6	27.8	8.2	5.6	13.1	0.82	0.65	0.88
Johnstown	28.9	22.4	3.8	4.9	31.1	9.1	8.5	16.3	0.76	1.04	1.05
Miami	18.4	25.0	11.8	10.6	47.4	10.9	11.6	13.0	1.05	1.22	1.05
Newark	18.0	21.2	9.2	14.8	45.2	13.7	9.4	13.2	1.26	1.10	0.92
Paterson, Clifton, Passaic	17.3	21.1	10.1	13.0	44.2	13.6	10.8	15.1	1.28	1.22	1.00
Philadelphia	20.4	21.3	7.6	10.6	39.5	11.9	8.2	14.6	1.07	0.95	1.03
Pittsburgh	20.3	24.5	6.7	9.3	40.5	12.1	7.4	16.5	1.02	0.88	1.05
Providence, Pawtucket	23.2	19.8	6.9	7.7	34.4	9.6	7.5	15.1	0.88	0.93	1.02
San Bernardino, Riverside, Ontario	13.9	27.4	12.9	9.3	49.6	12.2	12.5	16.0	1.02	1.40	1.19
San Diego	9.8	29.3	14.1	12.0	55.4	14.9	10.3	16.2	1.22	1.14	1.11
Seattle	9.0	28.9	13.4	15.0	57.3	15.4	10.4	15.3	1.31	1.15	1.05
Springfield, Chicopee, Holyoke	19.1	24.9	8.0	8.8	44.7	11.3	7.8	14.6	0.94	0.92	1.04
Syracuse	15.2	23.7	8.8	12.7	45.2	13.9	9.9	14.5	1.13	1.19	1.01
Utica, Rome	18.7	22.5	7.8	8.1	38.4	13.1	9.7	13.6	1.01	1.22	0.99
Wilkes-Barre, Hazleton	29.9	21.9	5.5	5.2	32.6	8.6	6.6	12.2	0.83	0.84	0.89
Worcester	18.0	22.4	9.8	9.2	41.1	12.3	7.9	15.1	0.95	0.97	1.04
Average	19.1	23.2	8.9	10.4	42.5	12.2	9.0	14.8	1.08	1.05	1.02
All Other Large Labor Markets	17.6	23.8	10.5	11.4	45.7	12.5	9.3	14.0			

Source: U.S. Bureau of the Census, U.S. Census of Population, 1960: Detailed Characteristics by State.

force in these areas would be drawn from this group. On the average, the labor force in these areas has less education than the labor force in remaining large metropolitan areas. A larger percentage of heads of households had less than a eighth grade education than in the remaining large areas (19.1 as compared to 17.6 percent), and the opposite is the case for high school graduates (23.2 vs. 23.8), some college (8.9 vs. 10.5), and college graduates (10.4 vs. 11.4). For all 24 areas combined, 42.5 percent of the heads of households had at least a high school education, as compared with 45.7 percent in other large labor markets.

The low educational attainment of the labor force is apparent in a number of areas. For example, the percentage of heads of household with at least a high school education was as low as 27.8 in Jersey City, 31.1 in Johnstown, 32.6 in Wilkes-Barre, and 34.4 in Providence. On the other hand, all high unemployment areas do not have labor forces with low educational attainment. This is particularly true in the West.

The fact that an area's labor force has a relatively low level of educational attainment does not necessarily imply the existence of a skill shortage. What is relevant is the demand for skilled labor in the area as compared with the skill content of the labor force.

Employment of Skilled Labor

For purposes of much of the following discussion, skilled labor is considered to be represented by three occupational categories--professional and technical workers, managers and proprietors, and craftsmen and foremen. The employment pattern of these three groups, as measured by the percent of the area's labor force employed in each group, varies among the areas. On the average, however, the pattern in the 24 areas is much the same as elsewhere (see Table 3-6). Professional and technical workers, and managers and proprietors account for a somewhat smaller proportion of total employment in these areas than elsewhere. The opposite is the case for craftsmen and foremen.

It is interesting to compare the actual employment of these skilled groups with what would be expected, given the area's industry mix. For all 24 areas, actual employment in each skilled group is slightly greater than what would be predicted on the basis of the mix of industries. This would certainly suggest that shortage of skilled labor is not a general problem in many of the areas of our sample.

On the other hand, for some areas, the data presented in Table 3-6 hint at the existence of a skill shortage. For example, in Jersey City, Johnstown, Providence, and Wilkes-Barre, the actual employment of professional and technical workers (and in most cases the other two skill categories) is considerably below the predicted levels given in the area's industry mix. The likelihood of a skill shortage in these areas is strengthened when it is noted that these four areas also had the lowest educational attainment levels. Indeed, for each of the higher skill groups there is a significant correlation (by ranks) between the level of educational attainment and the extent to which actual equals predicted employment. That is, the lower the level of educational attainment, the greater is the excess of predicted over actual employment.[16]

In summary, the evidence does not indicate any obvious shortage of skilled labor for most areas. While the levels of educational attainment are, on the average, lower than in the remaining large areas, actual employment of skilled labor is close to or higher than would be expected, given the industrial mix in each area. However, for a limited number of areas included in the sample, skill shortages do appear in a small number of areas; in these areas, skill shortages may well be a cause of the lagging employment growth.[17]

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[16] For both professional and technical, and managers and proprietors, the rank correlation is significant at the 1 percent level. The correlation for craftsmen and foremen is significant at the 5 percent level.

[17] It may be argued that since the most rapidly growing industries are those requiring a relatively large proportion of skilled labor, the evidence just cited does not prove that there are no skill shortages in most of the larger high unemployment areas. Adequate supplies of skilled labor at any given time do not necessarily assure adequate supplies when economic activity expands. However, as we have shown in Chapter 2, increases in employment during cyclical expansions are made up to a large extent by semiskilled and unskilled labor. Thus, it does not seem that a high degree of mobility of skilled labor is required for short-run considerations.

Unemployment Rates

In a smoothly functioning national labor market, unemployment rates for a particular occupation should tend to equalize themselves among areas. Shortages of a skilled occupation in one area should result in increased wages in that occupation, and this in turn should induce workers to leave the surplus area and move to the shortage area. The unemployment rates for the Census week indicate that there were no obvious shortages of skilled labor in the 24 areas in 1960. The unemployment rate for the three groups of skilled labor--professional and technical workers, managers and proprietors, and craftsmen and foremen--averaged 1.4, 1.5, and 5.4 percent; in the rest of the nation the rates were 1.4, 1.4, and 5.4.[18]

Migration Response in Depressed Areas

The unemployment rates just cited suggest that skilled workers do migrate so as to equalize unemployment rates among areas. To test this hypothesis directly, we estimated the actual migration response in depressed areas on the basis of a model that assumes that migration

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Mobility of skilled labor becomes more important for the longer run.

[18] Although the rates are virtually identical, data for only one week can hardly be regarded as conclusive.

is influenced by expectations concerning income-earning opportunities.

This hypothesis can be tested on the basis of 1960 cross-section Census data for 22 of the areas. The following equation has been fitted for each of the three occupation groups discussed above:

$$M_{ij} = a + b_1 \Delta E_j + b_2 U_j + b_3 Y_j , \qquad (3.2)$$

where M_{ij} is the net migration rate in 1955-60 in the ith occupation and jth area, ΔE_j is the change in employment in the jth area over the period 1950-55, U_j is the total unemployment rate averaged for 1953-57 in the jth area, and Y_j is median full-time income for 1959 in the jth area. Net migration is the dependent variable because differentials in economic opportunity should be expected to influence movement both into and out of each area. The three independent variables are designed to reflect differences in economic opportunity among the areas. The results of the three regressions are given in Table 3-7.

The variables chosen to represent differences in economic opportunity explain much of the difference in net migration among the depressed labor markets in the sample. In other words, movement of skilled labor is responsive to differences in economic opportunities. An improvement in income opportunities in a presently depressed area can thus be expected to attract skilled workers into the area. If these results are correct, it may be concluded that new industry will attract skilled workers from other areas if they are not already available in the local community.

Table 3-7. Coefficients of Regression and Multiple Correlation Between Net Migration Rates (1955-60) by Occupation and Rates of Change in Total Employment (1950-55), Average Unemployment Rates (1953-57), and Median Full-Time Income, All Workers, 1959 a/

Net Migration	Coefficient of				
	a	E_j	U_j	Y_j	R^2
Craftsmen and foremen	-3.47	.1615[b] (.0321)	-.7634[c] (.3664)	.0010 (.0015)	.75
Professional and technical workers	-42.60	.2009[b] (.0683)	-1.6012[b] (.7806)	.0087[b] (.0032)	.71
Managers and proprietors	-6.76	.1783[b] (.0236)	-.3301 (.2703)	.0010 (.0011)	.83

Source: Computed from data in U S. Bureau of the Census, U. S. Census of Population, 1960: Mobility for Metropolitan Areas.

a/ Standard errors of the regression coefficients in parentheses.

b/ Significant at the .01 level.

c/ Significant at the .025 level.

REGIONAL STRUCTURAL UNEMPLOYMENT AND THE TARGET RATE

The major conclusions regarding regional unemployment may be summarized as follows: (1) There is a regional component to structural unemployment, but it is probably not large. At most, the number is of the order of 83,000 if 4 percent is taken as the target rate and 147,000 if 3 percent is taken as the target rate. (2) Industry mix has little effect on the level of unemployment in the nation's labor market areas, at any given time; but it has a substantial effect on the response of depressed areas to increases in national demand. (3) Skill shortages do not account for high unemployment rates in most labor market areas; skilled workers seem to migrate to other areas if there are jobs there.

Although some regional structural unemployment exists, the data examined so far do not indicate whether it has become more serious in recent years. Evidence on this question may be obtained by comparing relative changes in unemployment rates in the most depressed areas and in all metropolitan areas. The data show that the 1965 unemployment rates in the 39 most depressed areas were lower than the rates for the most depressed areas in 1953, despite the fact that unemployment was relatively higher in all metropolitan areas in 1965 (Table 3-8).19/

19/ Edward F. Denison made similar calculations and arrived at the same conclusions on the basis of Census data for April 1950 and April 1960. See his unpublished memorandum, "The Dispersion of Unemployment Among Standard Metropolitan Areas" (Committee for Economic Development, 1962)

Table 3-8. Unemployment Rates in 39 Depressed Areas and in All Metropolitan Areas, May 1953 and May 1965

(percent)

Month and Year	All Depressed Areas	All Metropolitan Areas
May 1953	5.1	3.2
May 1965	4.8	3.6

Source: U. S. Department of Labor, Bureau of Employment Security.

This leads us to reject the hypothesis that the regional component of structural unemployment has grown, and to conclude that no change in the target unemployment rate needs to be made on this account in monetary and fiscal policy decisions.

CHAPTER 4

NEGRO AND YOUTH UNEMPLOYMENT

Despite continued growth in output and declining overall unemployment rates in the period 1961-64, high unemployment rates persisted among youths and Negroes. It is not clear, however, whether these unemployment rates reflected an inadequate level of aggregate demand or an increase in structural unemployment. This chapter examines the statistical evidence to determine whether structural unemployment has in fact risen among these groups.

EMPLOYMENT AND UNEMPLOYMENT TRENDS BY DEMOGRAPHIC GROUPS

As we have emphasized throughout, there will always be differences in unemployment rates for various occupation, age, sex, and other groups. Such differences do not necessarily indicate structural imbalances in the labor market. Part of the variance can be accounted for by such factors as the phase of the business cycle, distribution of group members by occupation or industry, and variation in voluntary and involuntary labor turnover among groups. What is more relevant to this study is the amount of unemployment in each group (over and above the frictional and seasonal minima) that would not yield to increases in demand.

Trends in Unemployment Rates

Analysis of the problem usually begins by fitting equations relating the unemployment rates in each group to an index of general conditions and a trend variable.[1] Such computations indicate how unemployment in the various groups reacts to short-run changes in aggregate demand. More detailed analysis is required to explain the factors that account for these results.

The following equation was fitted to annual unemployment rates for each age-sex-race group in the 17 years 1948-64:

$$U_{it} = a_i + b_i U^*_t + c_i t \qquad \ldots\ldots\ldots\ldots\ldots\ldots \quad (4\text{-}1)$$

where U_{it} is the unemployment rate for the ith group defined by age, race, and sex; U^*_t is the unemployment rate for "prime" age white males, 35-44; and t represents time.[2] The unemployment rate of "prime" age males is used as a measure of the level of demand rather than the more commonly used average unemployment rate. This avoids a dependent variable which is one of the components of the independent variable.

The results of the regression analysis are given in Table 4-1. For the most part, the two independent variables account for a highly significant proportion of the variation in the unemployment rates for each of the

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[1] See Lester C. Thurow, "The Changing Structure of Unemployment: An Econometric Study," Review of Economics and Statistics, Vol. 47 (May 1965), pp. 137-49.

[2] In this model the net change in a group's rate is assumed to be spread out evenly over the whole period, but this assumption is not crucial to the use made of the results.

TABLE 4-1. Unemployment Rates by Age, Race, and Sex, 1948-64, as a Function of Unemployment Rates for Prime-Age White Males

(Unemployment Rate for the ith Group = a_i + b_i[Unemployment Rate for White Males, 35-44] + c_i[Time])^1

Demographic Characteristic		a_i	b_i	c_i	R^2
			(Standard Errors in Parentheses)		
Male, white	14-19	3.130	2.04 (.25)	.24 (.04)	.92
	20-24	.044	2.54 (.18)	.02* (.03)	.94
	25-34	- .365	1.33 (.06)	.00* (.01)	.98
	45-54	.295	.99 (.04)	.01* (.01)	.98
	55-64	.660	1.12 (.08)	.00* (.01)	.94
	65+	1.175	.95 (.10)	.00* (.02)	.89
Female, white	14-19	2.976	1.62 (.34)	.27 (.06)	.84
	20-24	.547	1.33 (.13)	.17 (.02)	.95
	25-34	.780	1.14 (.12)	.08 (.02)	.93
	35-44	.491	.96 (.10)	.08 (.02)	.93
	45-54	.850	.86 (.12)	.03* (.02)	.84
	55-64	1.566	.68 (.13)	.00* (.02)	.70
	65+	.801	.63 (.19)	.03* (.03)	.55
Male, nonwhite	14-19	-1.879	3.65 (.58)	.91 (.10)	.93
	20-24	1.698	3.62 (.44)	.11* (.07)	.87
	25-34	-1.068	2.96 (.33)	.17 (.06)	.90
	35-44	- .436	2.36 (.21)	.10 (.04)	.93
	45-54	- .392	2.24 (.17)	.09 (.03)	.95
	55-64	.060	1.85 (.33)	.21 (.06)	.84
	65+	.491	1.46 (.43)	.26 (.07)	.74
Female, nonwhite	14-19	.964	2.64 (.78)	1.25 (.13)	.91
	20-24	1.725	2.44 (.50)	.55 (.09)	.88
	25-34	2.720	1.32 (.31)	.27 (.05)	.84
	35-44	- .248	1.63 (.25)	.24 (.04)	.90
	45-54	.552	.83 (.27)	.21 (.05)	.78
	55-64	.323	1.25 (.22)	.04* (.04)	.76
	65+	- .502	1.21 (.35)	.05* (.06)	.56

*Not significant at .05. All other coefficients significant at .025.

Source: Computed from annual data in U.S. Department of Labor, Manpower Report of the President, March 1965.

specific groups. The following facts stand out:

1. The unemployment rates for youths and nonwhite are generally very responsive to the prime age male unemployment rate, a given change in the latter being accompanied by much larger fluctuation in the former. This is shown by b_i in Table 4-1.

2. As indicated by c_i, unemployment among white males 20 years and older shows no time trend; the rates in these groups are very closely related to changes in the prime age rate alone. On the other hand, unemployment among white males age 14-19 increased by an average of .24 points per year (and this coefficient is statistically significant).

3. White females show a pattern similar to that of white males. The time trend for white females age 14-19 is .27 points per year, and it is significant. The trend for females age 20-44 is considerably smaller than that for teenagers. Unemployment rates for white females over 45 years of age show no significant trend.

4. The results for nonwhite workers contrast sharply with those for whites. Among nonwhite males unemployment rates for all age groups show a significant upward trend, but there are considerable differences among them. For teenagers the trend is .91 points per year, almost four times that of their white counterparts. The trend values fall considerably for nonwhites age 20-54, and rise above .20 points per year for older nonwhites.

5. Among nonwhite females there is a significant upward trend in all age groups except those 55 years of age and older. For teenagers, the value is 1.25, the largest of any of the demographic groups. The trend value declines for each subsequent age group.

Table 4-1 confirms the existence of an upward trend in unemployment rates for young workers in the labor force during the period 1948-64. The deterioration was much more severe for nonwhite youths than for white youths. Unemployment among nonwhite adults, both male and female, has also risen relative to the prime rate, particularly among older males and the middle-age females. Nevertheless, among all nonwhite workers the upward trend in the young age group is significantly greater than for all other groups, suggesting that much of the recent nonwhite unemployment problem is a youth problem as well.

It should be noted that the unemployment rates used for the years prior to 1957 have not been adjusted for the change in definition made in 1957. In that year, approximately 225,000 workers (or 0.4 percent of the labor force) previously considered as employed but not at work for various reasons were reclassified as unemployed. In effect this means that, on the basis of present definitions, the unemployment rates for the years before 1957 are biased downward. This does not necessarily bias our estimates of increased structural unemployment since we use as the independent variable the prime age male unemployment rate, rather than the gross national product. However, the target rate must be increased somewhat on this account. This is done in Chapter 5.

Labor Force and Employment Among Youth

The data presented in Table 4-2 show percentage changes in labor force and employment for several age-race-sex groups between 1955 and 1964.[3]

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[3] Because the data discussed later are often given for the age group 14-24, the specific group age 20-24 is included among the "youth" at this point.

TABLE 4-2. Percentage Changes in Employment and Labor Force by Demographic Characteristic, 1955-64

Demographic Characteristic	Percentage Change	
	Employment	Labor Force
Total	11.3	12.7
Adults, over 24 years	7.6	8.1
14 - 19 years	25.3	32.7
20 - 24 years	37.5	40.5
Male		
White, adult	1.7	1.9
White, 14 - 19 years	26.6	32.2
White, 20 - 24 years	46.9	48.7
Nonwhite, adult	8.7	8.3
Nonwhite, 14 - 19 years	0.0	12.9
Nonwhite, 20 - 24 years	38.2	40.3
Female		
White, adult	19.8	20.8
White, 14 - 19 years	30.6	38.1
White, 20 - 24 years	26.7	30.3
Nonwhite, adult	22.9	25.1
Nonwhite, 14 - 19 years	8.3	30.6
Nonwhite, 20 - 24 years	27.2	37.8

Source: Computed from data in U.S. Department of Labor, Manpower Report of the President, March 1964.

What stands out clearly in Table 4-2 is that employment increases for young workers exceeded, by a considerable margin, those for older workers of similar sex and race. Employment increased by 7.6 percent for those over 24 as compared with 25.3 and 37.5 percent for workers age 14-19 and 20-24, respectively. The significant exception, nonwhite males age 14-19, showed no increase in employment, while nonwhite females age 14-19, experienced an increase of only 8.3 percent (considerably less than other nonwhite females); for these youths, it is clear that lack of job opportunities is important in explaining their very adverse unemployment situation.

Table 4-2 also shows that the growth of employment for all adult workers was slightly exceeded by the increase in the labor force. The labor force growth in every category of the young work force increased more rapidly than their adult counterparts, and in all cases labor force growth of the young exceeded employment growth.

These results suggest that the growth of the unemployment problem for *white* youths between 1954 and 1964 was not so much the result of lagging employment opportunities as compared with adult workers, but rather a failure of employment opportunities to keep pace with the exceptionally large increase in the young labor force. On the other hand, employment for *nonwhite* youth (14-19) improved very little for females and not at all for males; given the substantial increase in the labor force, high unemployment rates were the result.

It should be noted that, in the regressions given in the previous section, the largest secular increases in unemployment rates were found among the youth age 14-19.

EMPLOYMENT CHARACTERISTICS OF YOUNG WORKERS

Even if all labor were homogeneous with respect to characteristics employers use to choose among applicants for jobs, the rapid entry into the labor force of a group with a particular demographic or social characteristic would result in a greater unemployment rate for this group. More members of the group will be looking for their first job under "normal" circumstances, but the problem will be aggravated when employment opportunities are growing at a slower rate than usual.

The problem is compounded if the group entering the labor force in relatively large numbers consists of teenagers. They are less experienced than older workers; they may have only a partial labor force commitment, seeking only part-time work, or part-year work; or, they may seek employment in areas, industries, and/or occupations where job availability is relatively limited or expanding more slowly than in other sectors of the economy. Some insights into the relative importance of these characteristics may be obtained from the available data for recent years.

Labor Turnover and Youth Unemployment

Labor turnover affects the distribution of unemployment among particular groups, as well as the level of frictional unemployment in general. If there is relatively little turnover, the unemployed may consist largely of those entering the labor force -- typically a high proportion of the young. With a higher turnover, the composition of the unemployed becomes more like that of the employed and the youth unemployment rate falls relatively to the rate in other groups. On the other hand, a drop in the rate of labor turnover lowers the level of frictional unemployment and thus the level of total unemployment, but it raises the proportion of unemployment suffered by youth.

The quit rate is dependent to a considerable degree on the unemployment rate. The following was fitted from annual averages for the period 1949-64:

$$Q = 4.0 - .43U \ (R^2 = .76) \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (4\text{-}2)$$

where Q is the quit rate and U the unemployment rate. This equation predicts a higher quit rate for the 1960s than was actually achieved, indicating that voluntary quits declined in recent years relative to the unemployment rate. The fact that quits were low when unemployment was high is part of the explanation for the sharp rise in youth unemployment rates when the rate for prime age males rose. [4]

These developments imply that some part of the recent upward trend of youth unemployment cannot be counted as structural, as the term is used in this monograph. The decline in the quit rate does not imply that the resulting unemployed would be unemployable when demand increased. Moreover, a prolonged period of high demand might encourage more experienced workers to risk brief periods of unemployment to find better jobs and thus reverse the downward trend in the relationship between the quit rate and the unemployment rate. This would reverse or slow down the upward trend in the relationship between the youth unemployment rate and the "prime" age rate. Estimates of structural unemployment among youth on the basis of the regressions in Table 4-1, which will be presented at the end of this chapter, are probably somewhat too high for this reason.

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[4] A similar point was independently developed in a paper by Edward D. Kalachek, "The Composition of Unemployment and Public Policy," in R.A. and M.S. Gordon, Prosperity and Unemployment (Wiley, 1965).

School Enrollment and the Search for Part-Time Work

There has been a considerable change in the proportion of young labor force participants age 14-19 enrolled in school. The proportion increased dramatically from 31.6 percent in 1948 to 54.8 percent in 1963. The proportion of unemployment in these age brackets attributable to those in school increased even more rapidly -- implying that the unemployment rate among youths in school has increased more rapidly than the rate for youths out of school, although the latter remains higher absolutely by a good margin (see Table 4-3).

Thus, in one respect, the increase in youths seeking employment has been associated with a change in the "quality" of the young labor force. An individual enrolled in school will find only limited employment opportunities. The limitation will be primarily in terms of the regularity of work and the number of hours in the work day, as well as in terms of occupation and industry.[5] Data on the growth and characteristics of the part-time work

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[5] For example, as of May 1965, approximately 95 percent of those employed in manufacturing industries were full-time workers, while only 71.4 and 75.9 percent of those employed in service and trade, respectively, were full-time. The same disparity occurs in occupations, e.g., 37.5 percent of private household workers and 94.2 percent of craftsmen and foremen were on full-time schedules. See U.S. Bureau of Labor Statistics, Earnings and Employment (June 1965), pp. 10-11.

TABLE 4-3. Labor Force and Unemployment for Youths by School Enrollment, 1948-63, May of Each Year (Percentages)

Year	Percent of Total Civilian Labor Force		Percent of Labor Force 14-19		Percent of Total Unemployed	
	Labor Force 14-19 Enrolled in School	Labor Force 14-19 Not Enrolled in School	Labor Force 14-19 Enrolled in School	Unemployed 14-19 Enrolled in School	Unemployed 14-19 Enrolled in School	Unemployed 14-19 Not Enrolled in School
1948	2.5	5.5	31.6	15.5	1.8	9.7
1949	2.5	5.2	31.9	17.2	1.7	8.3
1950	3.3	4.9	40.0	25.8	3.2	9.3
1951	3.1	4.5	40.8	28.2	3.1	7.9
1952	2.8	4.5	37.8	24.6	3.4	10.4
1953	2.6	4.4	36.9	23.9	2.9	9.4
1954	3.0	4.0	43.1	27.6	2.8	7.3
1955	3.4	4.1	45.7	37.9	4.9	8.0
1956	3.6	3.8	48.9	38.6	4.8	7.7
1957	3.7	3.7	50.0	37.2	4.8	8.1
1958	3.6	3.7	49.6	30.9	4.0	8.9
1959	3.9	3.7	51.5	32.9	5.0	10.2
1960	4.0	4.0	49.9	32.8	5.0	10.3
1961	4.0	4.1	49.7	36.5	5.7	9.9
1962	4.2	3.8	52.3	40.9	6.5	9.3
1963	4.5	3.7	54.8	41.3	7.9	11.2

Sources: Data for period 1948-58 obtained from U.S. Bureau of the Census, Current Population Reports, Series P-50, "Employment of Students." Subsequent data from U.S. Bureau of Labor Statistics, Special Labor Force Reports, Nos. 6, 16, 22, 34, and 42.

force support these implications.

The secular increase in youth enrolled in school and seeking employment as a component in the youth labor force has been paralleled by an increase in part-time employment. The relevant figures are given in Table 4-4. The number of part-time workers (for all reasons) varied between 12 and 16 percent of total employment during the years 1949-60, increased sharply to 19-20 in 1961-63, and declined to 16.3 percent in 1964. Some of this part-time work is involuntary in the sense that the worker usually works full time. What is more interesting for our purposes is the behavior of the "normal" part-time labor force, that is, a person at work in a job where he usually works part time.[6] Here there is an increase over the period 1949-64 from less than 9.3 percent of total employment in the early years to over 15 percent in 1964. A significant proportion of this increase is among young workers 14-19. The adult (over 24) work force seeking part-time employment as a percentage of total employment rose from 6 to 8 percent, while usual part-time workers, age 14-19, rose from around 2.5 percent at the start of the period to 4.8 percent in 1964. It is probably correct to assume that the rise in the number of young workers seeking part-time work and the rise in the number of youth enrolled in school are the same phenomenon.

Along with the secular increase in part-time employment, there has been an even greater relative increase in the percentage of those unemployed who

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[6] For a more detailed definition of the categories of part-time work, see U.S. Bureau of Labor Statistics, Growth and Characteristics of the Part-Time Work Force, Special Labor Force Report No. 10 (1960).

TABLE 4-4. Part-Time Employment, Nonagricultural Industries, 1949-64, May of Each Year

(Percentages of Total Employment)

	All Workers		14 - 19 Years		20 - 24 Years	
Year	Part-Time	Usual Part-Time	Part-Time	Usual Part-Time	Part-Time	Usual Part-Time
1949	14.4	9.3	3.0	2.5	1.4	0.8
1950	14.2	9.5	3.0	2.6	1.3	0.8
1951	13.4	9.3	3.0	2.6	1.2	0.7
1952	13.5	9.2	2.8	2.6	1.1	0.6
1954[a]	16.0	10.3	3.2	2.9	1.3	0.7
1955	12.5	10.7	2.5	2.4	0.9	0.7
1956	14.7	12.0	3.6	3.5	1.2	1.0
1957	14.3	12.1	3.6	3.5	1.2	0.9
1958	16.4	12.8	3.9	3.8	1.3	1.0
1959	14.6	13.0	4.0	3.9	1.1	0.9
1960	15.7	13.6	4.2	4.1	1.3	1.0
1961	19.0	13.1	4.3	3.7	1.4	1.1
1962	19.7	13.3	4.7	3.9	1.3	1.1
1963	19.6	13.2	4.7	3.8	1.4	1.3
1964	16.3	15.0	4.9	4.8	1.5	1.3

Sources: Data for period 1949-54 obtained from U.S. Bureau of the Census, Current Population Reports, Series P-50, "Part-Time Workers." Data for period 1955-64 from U.S. Bureau of Labor Statistics, Special Labor Force Reports, Nos. 10, 21, 31, 43, and 52.

[a] 1953 not available.

are seeking part-time employment (Table 4-5). In May 1955, 8.8 percent of the unemployed were seeking part-time work. The percentage more than doubled by May 1965 to 18.1 percent. Almost all of this increase came among workers age 14-19. For this age group, unemployed seeking part-time work as a percentage of total unemployed increased from 4.0 in 1955 to 11.7 in 1965; over the same period, of all unemployed workers age 14-19, the percentage seeking part-time work increased from 23.4 to 36.3.

Whether an increase in unemployment due to an increase in part-time job-seeking is an increase in structural unemployment depends on developments in periods of high demand. If an increase in demand leads employers to demand mainly more full-time workers, unemployment among those who wish part-time jobs will not be alleviated and they must be considered structurally unemployed. If, on the other hand, an increase in demand leads employers to be more flexible in taking on people on a part-time basis and if, at the same time, some of those who are in school and looking for part-time work are tempted to quit school and seek full-time work, the structural component in this type of unemployment is correspondingly smaller.

NEGRO UNEMPLOYMENT AND STRUCTURAL UNEMPLOYMENT

An extensive analysis of cross-section data from the 1960 Census by Harry J. Gilman[7] shows that for a single point in time much -- but by no means all -- of the excess of nonwhite unemployment rates over white rates

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[7] Harry J. Gilman, "Discrimination and the Non-White Employment Differentials," American Economic Review, 1966.

TABLE 4-5. Unemployed Seeking Part-Time Work, Selected Years, 1955-65, May of Each Year

Year	Total		14-19 Years		Unemployed, 14-19 Years	Unemployed, 14-19 Years Seeking Part-Time Work	Unemployed, 14-19 Years Seeking Part-Time Work
	Unemployed	Unemployed Seeking Part-Time Work	Unemployed	Unemployed Seeking Part-Time Work	Total Unemployed	Total Unemployed	Unemployed, 14-19 Years
	(Thousands)				(Percent)		
1955	2,490	218	428	100	17.2	4.0	23.4
1956	2,677	381	583	188	21.8	7.0	32.2
1957	2,827	290	607	129	21.5	4.6	21.2
1961	4,954	576	929	252	18.8	5.1	27.1
1963	4,066	632	1,157	354	28.5	8.7	30.6
1964	3,640	596	1,076	362	29.6	9.9	33.6
1965	3,334	605	1,074	390	32.2	11.7	36.3

Source: U.S. Bureau of Labor Statistics.

is explained by the distribution of Negroes by occupation, industry, and area.[8] The fact that Negro unemployment rates rise faster than do white rates when demand drops is explainable, at least in part, by the much discussed and little investigated "last-hired, first-fired" hypothesis.[9] From the standpoint of structural unemployment, this is an optimistic hypothesis since it implies that at some level of demand the excess nonwhite unemployment will disappear.

This section attempts to determine the reasons for the upward time trend in Negro relative to white unemployment rates and the likely behavior of the Negro rate during periods of high demand.

Negro Migration and Its Distribution

Between 1955 and 1960, 417,000 Negroes migrated from the Southern states to other states. To the extent that they migrated from farms -- which have extremely low observed unemployment rates -- to urban areas (or the migrants from the urban South were replaced by Negroes coming off Southern farms), the migration was bound to raise observed unemployment rates among

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[8] Of course, the distribution of Negroes by occupation, industry, and area at any moment in time reflects the effect of discrimination.

[9] Gilman's article, "The White/Non-White Unemployment Differential," in Mark Perlman (ed.), Human Resources in the Urban Economy (Johns Hopkins Press, 1963) discusses this question, but seems inconclusive.

Negroes.[10] At the same time, however, whites were also coming off the farm, raising their observed rates as well. If Negroes and whites had the same urban and farm unemployment rates, the move from the farm would have raised Negro unemployment rates from 4.8 to 5.1 percent between 1950 and 1961, while the rate for whites would have been raised from 5.0 to 5.2 percent. Thus, very little of the rise in Negro unemployment rates relative to white can be attributed to the difference between urban and rural unemployment rates.

However, the geographical distribution of Negro migration was not such as to minimize the resulting rise in their unemployment rates. Migration is influenced (and, of course, properly so) by noneconomic as well as economic factors. If migration is determined largely by noneconomic factors, the migrating group may well encounter serious economic difficulties. One contributing factor to the upward trend in Negro unemployment rates might be the tendency of the migrants to concentrate in places where employment prospects are relatively poor, attracted by the other advantages of such places (presence of a large, already-established Negro community, for example). This tendency has been observed among earlier migrant groups.

The model developed below describes what migration patterns would be if migrants used only employment opportunity as the criterion for choosing a new home. It assumes that a fixed number of migrants (M) move from one part of the country (the South) to another part (the rest of the country). Their migration is not assumed to create jobs anywhere. However, the migrants are assumed to share in the job opportunities of the existing white and Negro population. The unemployment rates in the ith state before and after migration of N_i persons to that state are

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[10] Employment of Negroes in agriculture was 18.4 percent in 1950 and 8.7 percent in 1964. The comparable figures for whites were 11.7 and 6.0 percent. U.S. Bureau of the Census, Statistical Abstract of the United States, 1965, Table 312, p. 227.

$$\frac{U_i}{LF_i} \text{ and } \frac{U_i + pN_i}{LF_i + pN_i}$$

where N_i is the number of migrants and p their labor force participation rate.[11]

If migrants share the employment opportunities in equal fashion with previous residents, the number of migrants employed will be

$$Z = \sum_i \frac{E_i}{LF_i + pN_i} pN_i \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots (4\text{-}3)$$

where E_i is employment in the ith state.

If the migrants distribute themselves so as to maximize the number of migrants employed, the N_i will be such as to maximize Z subject to the constraints

$$\sum_{i=1}^{K} N_i = M \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots (4\text{-}4)$$

and ;

$$N_i \geqq 0 \text{ for all } i \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots (4\text{-}5)$$

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[11] Since Negroes are restricted by job type, Negro employment and labor force might be more relevant for decision-making rather than for total population. However, these data are unavailable by area for any but the decennial census years.

This is a simple maximization problem, and given information about M and the E_i and LF_i, N_i can be determined by finding and solving the system of maximal size of the form

$$\begin{pmatrix} 1 & 1 & 1 & 1 & \dots & 1 \\ (E_2LF_2)^{1/2} & -(E_1LF_1)^{1/2} & 0 & 0 & \dots & 0 \\ 0 & (E_3LF_3)^{1/2} & -(E_2LF_2)^{1/2} & 0 & \dots & 0 \\ 0 & 0 & (E_4LF_4)^{1/2} & -(E_3LF_3)^{1/2} & \dots & 0 \\ \dots & \dots & \dots & \dots & \dots & \dots \end{pmatrix} \begin{pmatrix} pN_1 \\ pN_2 \\ \cdot \\ \cdot \\ pN_j \end{pmatrix} =$$

$$- \begin{pmatrix} pM \\ (E_2LF_2)^{1/2}\,LF_1 - (E_1LF_1)^{1/2}\,LF_2 \\ (E_3LF_3)^{1/2}\,LF_2 - (E_2LF_2)^{1/2}\,LF_3 \\ (E_4LF_4)^{1/2}\,LF_3 - (E_3LF_3)^{1/2}\,LF_4 \\ \dots \end{pmatrix} \quad \dots\dots\dots \quad (4\text{-}6)$$

for which (4-5) is satisfied. In practice, the model may be solved by starting out with the area with the highest premigration employment rate and successively including in the computation areas with lower and lower employment rates until N becomes negative for the marginal area.[12]

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[12] This model might be elaborated to take account of regional wage differences and transport costs, by maximizing an expression of the form

$$Z' = \sum_{i=1}^{K} \left(\frac{E_i}{LF_i + pN_i} \; pN_iW_i \right) - t_iN_i$$

subject to the same constraints as above, where W_i is the average wage in the ith area and t_i is a measure of the transport cost from the sending area.

Using equation (4-6), we have computed the "rational" distribution of Negro migrants from the South to the non-Southern states in the period 1955-60 on the basis of employment and labor force data for the years 1952-54. Only nonagricultural employment was available, but this is probably a virtue, since the migratory Negroes were undoubtedly headed for the urban job market. Unemployment was estimated by applying to state data on insured unemployment the national ratio of total to insured unemployment for the period. Labor force was obtained by adding the employment and unemployment estimates. The arithmetic mean of the three annual values was taken as representative of the period. The results are given in Table 4-6.

Comparison of the columns showing actual and "rational" migration indicates that more than half the migrants went to states with relatively high unemployment rates in 1952-54. This suggests that, at least part of the Negro unemployment problem is a regional one, which can be solved if information on job opportunities can be made available to the migrants and they can be persuaded to migrate to these areas. Another possibility is the establishment of new industries in areas with high Negro unemployment.

Negro Unemployment Under High Demand Conditions

Really high demand conditions for the nation as a whole did not exist between 1955 and 1965, so that there was no direct recent evidence on how the Negro unemployment rate would behave under such conditions. The solution we adopted was to fit a relationship between Negro and white unemployment rates on the basis of cross section data and to examine Negro rates in the cities with very low white unemployment rates.

The following regression was computed for the Negro and white males in

TABLE 4-6. Actual and "Rational" Migration of Nonwhites from South to Non-Southern States

(Number in thousands)

Receiving State	Unemployment Rate, 1952-54[a]	Number of Migrants, 1955-60	
		Actual[b]	"Rational"[c]
District of Columbia	1.2	29	20
Colorado	1.3	4	16
South Dakota	1.4	*	5
Nebraska	1.6	2	12
Iowa	2.0	1	20
Kansas	2.1	6	17
Wyoming	2.2	*	3
North Dakota	2.7	*	3
New Mexico	2.7	4	5
Ohio	3.1	33	70
Utah	3.1	*	5
Arizona	3.2	4	5
Wisconsin	3.2	7	24
Montana	3.4	*	3
Connecticut	3.4	9	17
Missouri	3.5	14	25
Minnesota	3.6	1	16
Indiana	3.7	11	24
Nevada	3.8	2	1
Vermont	4.2	*	1
Illinois	4.2	49	47
California	4.8	73	30
Michigan	5.0	23	16
Massachusetts	5.0	7	11
Idaho	5.0	*	1
New Jersey	5.3	29	6
New York	5.4	73	16
Maine	5.8	1	0
Pennsylvania	6.1	25	0
Washington	6.5	5	0
Oregon	6.7	1	0
New Hampshire	7.3	*	0
Rhode Island	8.8	1	0
Total		418	418

[a] Derived from Nonagricultural Employment and Insured Unemployment data in U. S. Department of Labor, Manpower Report of the President, March 1964, Tables D-1 and D-4.

[b] Data from U. S. Bureau of the Census, Census of Population 1960: Mobility for States and State Economic Areas, Table 18.

[c] See text for method of calculation. Entries do not add to total because of rounding.

*Less than 500.

67 cities in the standard metropolitan areas given in the 1960 census.[13]

$$y = .2494 + \underset{(.280)}{1.900}\, x_1 - \underset{(.650)}{2.403}\, x_2 - \underset{(1.039)}{3.111}\, x_3 \quad \ldots\ldots\ldots \quad (4\text{-}7)$$

$$R^2 = .48$$

where y = nonwhite unemployment rate

x_1 = white unemployment rate

x_2 = 1 for cities in the south; 0 otherwise

x_3 = 1 for Hawaii and California; 0 otherwise.[14]

The behavior of Negro unemployment under conditions of high demand is suggested by the relationship between actual and predicted Negro unemployment rates in the 25 cities with white unemployment rates at or below 3.5 percent. Among these 25 cities, the actual nonwhite unemployment rates were below those predicted by the equation in 14 cases. Of the ten cases where white unemployment rates were at or below 3.0 percent, actual nonwhite unemployment rates were below the predicted rates in 7 cases.

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[13] U.S. Bureau of the Census, Census of Population 1960: Detailed Characteristics, Table 115 from state books.

[14] This variable was used to allow for the fact that many nonwhites in these two states are not Negro. The results are fairly consistent with those obtained from an equation computed from time series for the period 1955-64. The cross-section intercept adjusted for the United States average is 1.7, while the time series intercept is .7. The time series coefficient for nonwhite or white unemployment is 2.1, as compared with 1.9 for the cross-section.

This would be a more impressive finding if the correlation coefficient were higher, but it does give considerable support to a "last hired" hypothesis and suggests that Negro unemployment would decline as fast or faster than predicted by equation (4-1) which was used to calculate predicted unemployment rates by age and color groups in Table 4-1. Thus, Table 4-1 probably overestimates structural unemployment.

IMPLICATIONS FOR THE TARGET UNEMPLOYMENT RATE

It is possible to utilize the regression results derived from equation (4-1) and given in Table 4-1 to arrive at estimates of unemployment for those groups -- youths, females, and nonwhites -- experiencing a secular increase in unemployment rates, for a period of high demand. We make the assumption that monetary and fiscal measures can reduce the unemployment rate for prime age white males (henceforth "prime rate") to the levels attained in earlier periods, and that rates for all these groups can be predicted by equation (4-1).

In 1953 the rate for white males age 35-44 was 1.5. As explained in Chapter 1, the 1953 rate is used because it represents the lowest unemployment rate achieved during the postwar period without inflation. Similar computations are also made on the 1956 rate because much of the discussion in the literature centers on conditions pre- and post-1956. The assumption that the prime rate can be reduced to the previous postwar low implies that there has been no increase in structural unemployment in this group.

The estimates of increased unemployment by age, race, and sex due to adverse time trends were made by adding to the unemployment rate actually achieved in 1953 and 1956 for each category the computed increase in the rates due to trend by 1964. The trend value was obtained by multiplying the number of elapsed years by the coefficient of the time variable for that category as shown in Table 4-1.

As can be seen in Table 4-7, the calculated 1964 unemployment rates for youth -- both white and nonwhite males and females -- are considerably above the 1953 and 1956 rates. For white youths the rates are about 2 points higher as compared with 1956 rates, and the differences are, of course, still larger as compared with 1953. For nonwhite males the predicted rates are about 7 points higher than 1956 rates; again the differences are even greater when compared with 1953 rates. For white adult females the predicted rates are slightly higher than the 1956 and 1953 rates, while the differences in nonwhite adult rates are larger. However, in all sex-race categories, the differences for youths are considerably greater than other age groups.

These results could have been anticipated at least in a qualitative sense from the time trends given in Table 4-1. However, the data are now available to answer the following questions: What would the overall unemployment rate have been if the prime rate in 1964 had been reduced to its 1953 (or the 1956) level and if the computed short-run relationship between each group's unemployment rate and the prime rate were assumed to hold? What is the contribution of each demographic group to the excess unemployment which would have remained if prime rates in 1964 had been reduced to the 1953 (or 1956) level?

To make these calculations, we used the labor force sensitivity estimates of Tella to obtain the 1964 labor force figures for each demographic

TABLE 4-7. Estimates of the Effect of Trends in Unemployment Rates, 1964

Age, Race, Sex		Unemployment Rates			
		Prime Rate at 1956 Level		Prime Rate at 1953 Level	
		Constructed* 1964	Actual 1956	Constructed* 1964	Actual 1953
		(In Percent)			
White male	14-19	10.8	8.9	8.9	6.3
	20-24	5.8	5.6	3.9	3.7
	25-34	2.5	2.5	1.6	1.6
	35-44	2.0	2.0	1.5	1.5
	45-54	2.6	2.5	1.8	1.7
	55-64	2.9	2.9	2.2	2.2
	65+	3.1	3.1	2.1	2.1
White female	14-19	10.8	8.6	8.4	5.4
	20-24	5.9	4.5	5.2	3.3
	25-34	4.1	3.5	3.2	2.3
	35-44	3.6	3.0	2.7	1.8
	45-54	3.1	2.9	2.0	1.7
	55-64	3.1	3.1	1.8	1.8
	65+	2.1	1.9	1.5	1.2
Nonwhite male	14-19	20.9	13.6	17.1	7.1
	20-24	11.8	10.9	8.3	7.1
	25-34	8.3	6.9	5.6	3.7
	35-44	6.8	6.0	4.2	3.1
	45-54	5.7	5.0	5.3	4.3
	55-64	9.1	7.4	5.5	3.2
	65+	6.4	4.3	5.5	2.6
Nonwhite female	14-19	29.6	19.6	21.3	7.5
	20-24	17.6	13.2	10.9	4.9
	25-34	10.1	7.9	7.2	4.2
	35-44	6.6	4.7	5.4	2.8
	45-54	5.9	4.2	4.0	1.7
	55-64	4.3	4.0	1.9	1.5
	65+	4.7	4.3	2.2	1.6
Totals and Averages		4.5	3.8	3.3	2.5

*Unemployment rates constructed by adding appropriate time trend as computed from Table 4-1 to actual rate for base date.

Source: Computed from data given in U.S. Department of Labor, Manpower Report of the President, March 1965.

Table 4-7 (Continued)

Age, Race, Sex	Predicted Labor Force 1964 (Prime Rate at 1956 Level)	Predicted Unemployment 1964 (Prime Rate at 1956 Level)	1964 Excess Unemployment (Prime Rate at 1956 Level)	Predicted Labor Force 1964 (Prime Rate at 1953 Level)	Predicted Unemployment 1964 (Prime Rate at 1953 Level)	1964 Excess Unemployment (Prime Rate at 1953 Level)
			(In Thousands)			
White male						
14-19	3,405	368	65	3,441	306	86
20-24	4,222	245	8	4,291	167	8
25-34	8,811	220		8,833	141	
35-44	10,063	201		10,063	151	
45-54	9,056	235	9	9,066	163	9
55-64	6,195	180		6,229	137	
65+	1,972	61		2,022	42	
White female						
14-19	2,480	268	55	2,515	211	75
20-24	2,812	166	39	2,827	147	67
25-34	3,476	143	21	3,504	112	31
35-44	4,846	174	29	4,884	132	44
45-54	5,045	156	10	5,153	103	15
55-64	3,097	96		3,161	57	
65+	895	19	2	910	14	3
Nonwhite male						
14-19	450	94	32	459	78	46
20-24	592	70	5	609	51	7
25-34	1,071	89	15	1,079	60	21
35-44	1,101	75	9	1,103	46	12
45-54	904	52	6	904	48	9
55-64	575	52	10	593	33	14
65+	187	12	4	191	11	6
Nonwhite female						
14-19	284	84	28	298	63	41
20-24	427	75	19	447	49	26
25-34	751	76	17	773	56	23
35-44	828	55	16	837	45	22
45-54	688	41	12	715	29	16
55-64	368	16	1	382	7	2
65+	87	4		92	2	1
Totals and Averages	74,688	3,327	412	75,381	2,461	584

group.[15] These are given by age and sex only and it was necessary to assume that there is no difference in labor force response by race.[16]

The predicted overall unemployment rate in 1964 is 3.3 percent (Table 4-7) as compared with the (unadjusted) 1953 rate of 2.5 percent. In other words, the time trends in unemployment rates derived from equation (4-1) suggest that, if the prime rate in 1964 had been lowered to its 1953 level, overall unemployment rates would exceed the rate for 1953 by 0.8 points. (If 1956 is used as a base, the correction would be 0.7 points.)

In a preceding section we suggested that the large secular increase in unemployment rates for teenagers might be the result of the rapid growth in preference for part-time labor among young workers. In 1956 there were 188,000 youths (age 14-19) unemployed and seeking part-time work. By 1964

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[15] A. Tella, "Labor Force Sensitivity to Employment by Age, Sex," Industrial Relations, Vol. 4 (February 1965), p. 74.

[16] Jacob Mincer argues persuasively that Tella's labor force sensitivities may be overstated. See "Labor Force Participation and Unemployment," in R.A. and M.S. Gordon, editors, Prosperity and Unemployment (Wiley, 1965). An overstatement of labor force response leads to an upward bias in our estimates. Mincer also suggests that the labor force response by race among adult females varies, with nonwhite labor force actually declining in the face of increased overall employment. To the extent that this is true, our estimates are too low for white females and too high for nonwhite females.

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this figure increased to 362,000 (Table 4-5). This is an increase of 174,000. The excess unemployment among youth calculated in Table 4-7 equals 180,000. Too much cannot be made of the similarity of these two figures because demand in 1964 differed from the level assumed in our calculations. However, it suggests that the increases in the trend rate of unemployment may be accounted for in considerable measure by increases in those seeking part-time work.

SUMMARY

Equation (4-1) indicates that the average 1964 unemployment rate would have been 3.3 percent if demand conditions had been such as to restore the unemployment rate for white prime-age males to their 1953 levels. This represents an increase of 0.8 percentage points over the actual 1953 rate of 2.5 percent. The change in the official definition of unemployment increased the unemployment rate by 0.4 points. Thus, assuming that the entire adverse trend in the employment of youth and Negroes is explained by an increase in unemployability, the target unemployment rate for monetary and fiscal policy was 1.2 percent higher in 1964 than the 1953 rate, 3.7 percent. This is a maximum estimate, however, because a significant part of the rise in unemployment of youths and Negroes was due to factors which did not imply an increase in unemployability among the groups.

CHAPTER 5

THE TARGET UNEMPLOYMENT RATE AND STRUCTURAL UNEMPLOYMENT

In this monograph, structural unemployment is defined in terms of a target unemployment rate that could be achieved by monetary and fiscal policy without setting off a continuing inflation due to significant and widespread shortages of labor. Structural unemployment is the amount of unemployment at the target rate less minimal frictional and seasonal unemployment.

Our strategy for estimating the target rate was to (1) measure the contribution to structural unemployment of skill shortages, regional demand patterns, employability of youths and Negroes, and (2) determine whether structural unemployment from these sources has changed since 1953.

The year 1953 was chosen as a base because labor shortages did not appear in that year, even though unemployment was low. Prices were also generally stable in 1953. These conditions suggest that the economy was at or perhaps slightly above the target unemployment rate in 1953.

The first step in the calculation of the target rate was to estimate an "interim" overall unemployment rate that would have been achieved in 1964 if (a) labor force groups whose employability had not changed returned to their 1953 unemployment rates, and (b) those groups whose employability had been impaired achieved their 1953 rates plus the estimated deterioration (obtained from recent trends in employment and unemployment of different demographic and skill groups). Since the economy in 1953 was at or above the target rate, the "interim" target rate is the upper limit of a band of rates containing the target rate.

SUMMARY OF SECTORAL RESULTS

Most of the analysis was concerned with the measurement of recent changes in structural unemployment resulting from the inability of members of lower skill groups to fill demands for skilled labor, regional imbalances in the demand and supply of labor, and age and race of new entrants to the labor force. The findings may be summarized as follows:

1. Changes in unemployment of professional, technical, and managerial workers are almost entirely explained by a simple upward time trend (plus seasonal unemployment); changes in business conditions have very little effect on their rate of unemployment. The major effect of short-run increases in demand is to increase the demand for unskilled workers, either because the new jobs do not require skills or because the skills that might be obtained by the on-the-job experience are sufficient. Thus, the skill problem is not an important component of structural unemployment.

2. There is a regional component to structural unemployment, but it was not larger than 8 percent of 1964 unemployment and had not worsened since 1953.

3. Negroes and youths were not as "employable" in 1964 as in 1953, even correcting for the higher level of demand relative to supply in 1953. The effect of the deterioration in the employability of these groups on the target unemployment is a maximum of 0.8 percentage points, with the strong presumption that the actual effect is less.

Summing these results, a maximum of 0.8 points must be added to the 1953 unemployment rate of 2.5 to arrive at the target rate in 1964. An additional 0.4 points must be added because of a change in the definition of unemployment in 1957, raising the "interim" target rate to 3.7 percent. If continued, the same trends would raise the "interim" target rate by .073 points per year.

The simplicity of the summation process derives from the fact that we found only one source of increased structural unemployment--among Negroes and youths. Had other sources been found, the summation problem would have been much more complicated. It would have to obtain joint distributions of characteristics affecting structural unemployment and to take into account the effects of interactions.

FRICTIONAL AND SEASONAL STRUCTURAL UNEMPLOYMENT

The Bureau of Labor Statistics has estimated that in 1957 seasonal unemployment was one-quarter of total unemployment or about 1.1 percent of the labor force. 1/ The Bureau also estimates that voluntary job changes amounted to 10 percent of those persons who suffered unemployment in 1955; 2/

1/ U. S. Bureau of Labor Statistics, The Extent and Nature of Frictional Unemployment, Study Paper No. 6, Study of Employment, Growth and Price Levels, Joint Economic Committee, 86 Cong. 1 sess. (1959), p. 52 ff.

2/ Ibid., p. 39.

this amounted to about 0.4 percent of the labor force. Therefore, 1.5 percentage points is the minimum amount to be subtracted from the 3.7 percent to arrive at structural unemployment. The difference of 2.3 is an estimate of the maximum percentage of the labor force that could be considered as structurally unemployed in 1964.

CONCLUSION

We conclude that 3.7 percent is the upper limit of a band of unemployment rates within which the borderline of conditions of significant labor shortages is located. This includes a maximum estimate of 2.3 percent of the labor force as structurally unemployed.

It must be emphasized that this target rate was estimated by examining labor force characteristics alone. Other developments associated with high levels of economic activity--cost-price pressures, balance of payments problems, etc.--will also affect the target rate, but these matters are beyond the scope of this monograph.

APPENDIX A

ANALYSIS OF LONG-TERM UNEMPLOYMENT

The number of persons who are unemployed for considerable periods is frequently used as a measure of structural unemployment. Unemployment of fifteen weeks duration or over is conventionally thought of as "long-term unemployment." These long-term unemployed are often referred to as "the hard core," a term which is hardly accurate since the amount of long-term unemployment varies greatly over time. However, the diagnostic value of the long-term unemployment series is considerable.

It is natural to attempt to explain the movement of long-term unemployment by movements in the total unemployment rate with appropriately distributed lags. 1/ A rise in the unemployment rate that persisted would at first lower the proportion of long-term unemployed in the total. Later, the proportion may be expected to rise above its previous level as the average length of unemployment increases.

1/ This is the method used by N. J. Simler, "Long-Term Unemployment, the Structural Hypothesis, and Public Policy," American Economic Review, Vol. 54 (December 1964), pp. 985-1001. He used only a one-month lag.

However, regressions with long-term unemployment (proportion or quantity) as a dependent variable and lagged total unemployment (rate or level) as the principal explanatory variable leave out of consideration one relevant factor. The "unemployability" of the long-term unemployed cannot be inferred from the proportion of long-term unemployment in the total; it depends also on the turnover among the unemployed. For example, a 40 percent incidence of long-term unemployment would be indicative of a high degree of unemployability among the long-term unemployed if 30 percent of the unemployed leave unemployment every month and are replaced by newly unemployed. On the other hand, if the turnover among the unemployed is 5 percent per month, the probability that any unemployed worker will be able to obtain a job is low; accordingly, it is very likely that any worker who finds himself unemployed would have a run of 15 unsuccessful weeks of job-hunting. Such a run would not necessarily reflect on his employability (although the duration of the period of unemployment might itself affect his subsequent chances). 2/

This factor can be taken into consideration directly using gross flows into and out of unemployment as the explanatory variables rather than the level of unemployment or its net changes. 3/ The flow into

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2/ This is suggested by Simler, ibid.

3/ These data have not been published, but have been made available unemployment in any week establishes the size of a newly born cohort of unemployed, whose "survivors" will, 15 weeks later, have been unemployed 15 weeks. The flow out of unemployment in any week as a fraction of the stock of unemployed is a measure of the mean probability of leaving unemployment. [4]

The gross flow data may be used to construct a hypothetical time series on the incidence of long-term unemployment, on the assumption that at any point in time every unemployed person has the same chance as any other unemployed person, of leaving the state of unemployment. In the world which generates the hypothetical series, there can be no structural unemployment whatever because the labor force is assumed to be perfectly homogeneous.

The hypothetical series was constructed on the basis of time series on the flows into unemployment between one month and another and on the size of the group which remained unemployed. Let EU_t represent the number of persons who reported themselves as employed in period t-1 and unemployed in period t, [5] and OU_t and UU_t the size of the

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to the authors by the Bureau of Labor Statistics.

[4] A worker leaves the state of unemployment by becoming employed or leaving the labor force.

[5] A period here is a week. The transition from monthly data to weekly

groups unemployed in period t and who reported themselves respectively out of the labor force and unemployed in period t-1. 6/ Total unemployment in period t is

$$U_t = EU_t + OU_t + UU_t \qquad \text{(A-1)}$$

At time t, the number of persons who will have been unemployed exactly n periods is

$$(OU_{t-n} + EU_{t-n}) \prod_{i=0}^{n-1} \frac{UU_{t-i}}{U_{t-i-1}} \qquad \text{(A-2)}$$

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magnitudes was made by assuming that, between one monthly reporting period and the next, the flows per week were at that constant rate which would have resulted in the observed changes recorded between one monthly survey and the next.

6/ This follows the notation of Stuart Altman whose article ("Effects of Inter-Labor-Force Mobility in the Unemployment and Labor Supply of Married Women," 1963 Proceedings of the Business and Economic Statistics Section, American Statistical Association) contains a good description of the data and the problems with them, and suggests a method of correcting their most obvious shortcomings. We have used a correction method similar but not identical to that described by Altman.

and the hypothetical proportion of persons unemployed k or more periods at time t to total unemployment at time t is

$$H_t = \left[U_t - \sum_{n=1}^{k-1} (OU_{t-n} + EU_{t-n}) \prod_{i=0}^{n-1} \frac{UU_{t-i}}{U_{t-i-1}} \right] / U_t \qquad \text{(A-3)}$$

The essential idea of (A-1) and (A-2) is that the average ex post probability of remaining unemployed in the (t-i)th period,

$$UU_{t-i} / U_{t-i-1},$$

is assumed to apply to everyone, regardless of how long he has been unemployed, and regardless of race, sex, skill, industry attachment and so on. The series H_t can be thought of as representing the isolated effect on long-term unemployment of the pattern of past flows into and out of unemployment, with "structural" effects eliminated.

The data allow us to compute H_t back to 1949 on a monthly basis with only a few gaps in the series. The results are given with the actual incidence of unemployment in Table A-1.

In the first six months of 1964, for example, long-term unemployment averaged 27 percent of total unemployment, while the hypothetical incidence averaged 13 percent. Thus, about half of long-term unemployment in 1964 can be explained by the pattern of overall unemployment rates and flows; the other half can be attributed to the unequal probability of leaving the state of unemployment among various groups.

Table A-1

Long-term Unemployment as a Percentage of Total Unemployment, Actual and Hypothetical, 1947-64 1/

		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1947	Actual	20.4	20.9	21.9	21.1	25.0	16.1	16.5	17.8	14.0	15.0	15.5	16.7
	Hypothetical	*	*	*	*	*	*	*	*	*	*	*	*
1948	Actual	14.9	12.4	15.0	18.5	21.9	15.8	12.1	15.1	14.1	16.3	11.7	13.1
	Hypothet.	*	*	*	*	*	*	*	*	*	*	*	*
1949	Actual	11.7	13.4	16.5	20.4	21.5	19.7	18.7	21.7	26.1	22.9	23.3	23.4
	Hypothet.	*	*	*	*	14.5	12.5	11.6	13.1	14.8	14.3	13.3	13.3
1950	Actual	20.9	23.4	28.4	33.6	34.0	27.0	21.6	22.0	24.4	22.7	16.9	18.4
	Hypothet.	14.7	15.3	17.9	20.9	23.7	17.0	13.6	12.5	12.4	13.8	9.3	8.5
1951	Actual	17.3	18.9	21.3	21.9	19.6	13.4	12.6	13.7	12.1	13.4	12.9	13.6
	Hypothet.	7.0	7.8	8.2	9.6	8.8	6.0	4.5	4.3	4.4	4.7	4.1	4.5
1952	Actual	13.6	14.0	16.9	20.0	16.1	11.7	9.1	11.2	14.7	14.2	11.4	14.4
	Hypothet.	5.0	5.6	6.4	7.4	6.2	5.1	3.6	3.7	4.2	4.4	3.6	3.7
1953	Actual	14.2	13.8	16.7	15.3	15.9	13.6	9.8	12.1	11.3	11.5	11.4	11.5
	Hypothet.	*	*	*	*	*	*	*	*	*	*	*	*
1954	Actual	12.0	17.2	27.1	30.2	31.7	25.7	25.4	26.4	26.9	29.1	25.3	24.9
	Hypothet.	*	*	*	*	14.4	14.3	12.9	13.0	12.2	12.4	12.2	11.7
1955	Actual	26.1	28.8	33.4	37.5	35.3	24.2	23.7	20.6	21.3	21.2	17.6	20.5
	Hypothet.	11.6	13.1	15.9	17.3	16.6	10.7	8.9	6.8	6.8	6.3	6.2	7.0
1956	Actual	19.1	22.0	24.1	25.3	23.1	17.1	17.0	21.4	23.5	22.0	17.7	19.6
	Hypothet.	8.1	11.1	12.8	13.0	10.8	8.6	7.4	8.5	8.0	7.9	6.3	6.1
1957	Actual	15.4	19.8	23.0	26.2	23.5	15.2	16.4	18.0	17.9	20.9	16.4	18.6
	Hypothet.	*	*	*	*	10.5	7.5	7.1	6.9	7.1	7.0	6.5	7.3

Table A-1 (concluded)

		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1958	Actual	19.2	22.2	27.8	36.8	35.7	29.8	31.5	35.1	35.5	36.6	32.2	31.7
	Hypothet.	9.4	11.1	14.0	16.4	19.0	16.3	15.5	15.5	16.9	18.1	15.7	14.5
1959	Actual	29.1	30.8	35.4	38.5	33.0	23.3	21.8	22.9	22.8	22.2	21.4	22.7
	Hypothet.	15.1	16.3	18.3	18.6	16.7	11.6	9.6	8.2	8.9	8.7	8.1	8.1
1960	Actual	21.9	24.5	28.9	32.9	26.6	18.4	20.8	21.5	23.8	27.7	24.5	22.4
	Hypothet.	9.1	10.8	12.0	13.6	12.2	9.7	8.4	8.3	10.6	10.4	9.9	10.4
1961	Actual	24.9	28.5	33.9	42.9	40.2	28.2	31.8	31.7	30.8	31.5	28.5	30.1
	Hypothet.	10.5	14.6	16.4	20.3	19.8	16.2	14.3	13.6	14.4	12.9	13.1	12.0
1962	Actual	26.9	31.5	33.9	37.6	34.3	23.1	22.9	23.7	25.8	26.3	22.8	25.6
	Hypothet.	11.8	13.6	14.6	15.3	13.3	10.2	9.2	9.3	9.5	9.2	8.6	8.9
1963	Actual	24.7	26.5	30.8	35.0	31.8	21.0	21.6	24.6	25.2	26.6	22.0	24.1
	Hypothet.	9.0	11.9	13.8	15.1	13.8	10.0	9.3	9.7	10.1	9.8	9.0	9.6
1964	Actual	24.2	25.7	30.8	31.5	29.8	21.5	22.5	21.6				
	Hypothet.	11.4	12.4	13.3	15.1	14.1	9.9	*	*				

* Gross flow data werenot available to support the estimation of the hypothetical incidence for this month.

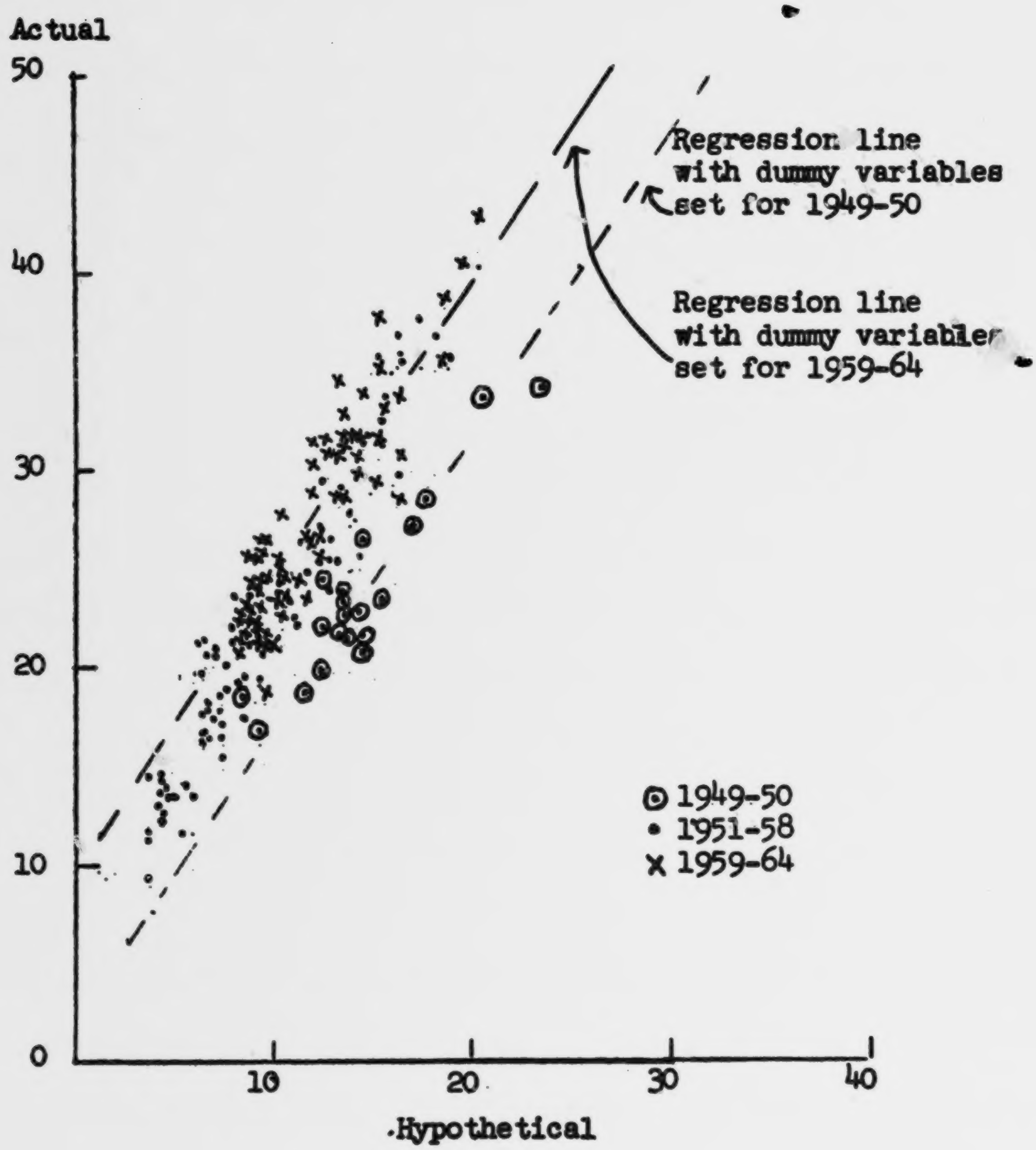
1/ Long-term unemployment is defined as unemployment of 15 weeks or longer. None of these magnitudes has been seasonally adjusted.

The differences between the actual and hypothetical percentages in Table A-1 must be interpreted with care; in particular, they do not represent the proportion of structural unemployment in total long-term unemployment. Two additional points are particularly noteworthy.

1. All forms of unequal opportunity to leave unemployment cannot be regarded as leading to "structural unemployment" as defined in Chapter 1. For example, inexperienced workers who are laid off may initially have a poorer than average chance of getting a job, but their chances improve as demand increases. Thus, when seasonal unemployment rises, the gross flow data generated will cause expression A-3 to fall initially, which will be in line with the behavior of the observed data. However, as the seasonally unemployed return to their jobs, the actual proportion of long-term unemployment will rise relative to the hypothetical level. Thus, the actual and hypothetical incidence of long-term unemployment, as well as the differences between them, show a seasonal variation; and part of the differences between them in all months is due to the presence of seasonal in total unemployment.

2. A worker may leave unemployment in two ways: he may secure a job or leave the labor force. If those who have a relatively low probability of finding a job have a relatively high probability of leaving the labor force, substantial equality in probability of leaving the state of unemployment may mask substantial inequality of leaving unemployment by finding a job. However, this objection is not serious in a measure of unemployability among the long-term unemployed as currently defined

Chart A-1. Percent of Unemployed Out of Work 15 Weeks or More, Actual vs. Hypothetical, 1949-64



has occurred which cannot be attributed to higher unemployment rates or reduced labor turnover. It is important to note, however, that most of the rise occurred in the early 1950s, and indeed, dropping D_{52} and D_{58} gives

$$A_t = .1 + \underset{(.05)}{1.64}\, H_t + \underset{(.6)}{7.0}\, D_{50} \qquad \text{(A-6)}$$

and only drops the R^2 to .89.

The fact that the coefficient of H_t in these equations is greater than 1 may be interpreted to mean that relative inequality of opportunity rises when unemployment is high. This probably occurs in part because of last-hired, first-fired practices which discriminate against Negroes and other unskilled groups such as youths.

APPENDIX B

ELASTICITY OF EMPLOYMENT IN "DEPRESSED AREAS"

Table B-1 provides the coefficients, standard errors, and R^2 for the regressions used to compute the annual employment trends and employment elasticity coefficients for the depressed areas shown in Table 3-2. The regressions were based on the following formula:

$$E_i = AE^b(1 + r)^t \qquad (3\text{-}1)$$

or

$$\log E_i = \log A + b \log E + t\log(1 + r) \qquad (3\text{-}2)$$

where E_i is local area employment, E is national employment, r is the trend rate of growth (or decline), and t is time on a bimonthly basis. The least squares estimate of b in the logarithmic form (3-2) is the elasticity of local area employment with respect to national employment. Log (1 + r) is the estimate of the time trend. The annual trend shown in the first column of Table 3-2 was computed by taking the antilogarithm of the coefficient shown in the first column of Table B-1, raising it to the sixth power, subtracting 1 and multiplying by 100.

Table B-1. Coefficients and Standard Errors in Regressions to Determine Employment Elasticities in "Depressed" Labor Market Areas, 1952-64

Labor Market Area	Coefficient of t $\log(1+r)\times 10^4$		Coefficient of Log E (b)		R^2
	Coefficient	Standard error	Coefficient	Standard error	
Group 1 a/					
Mayaguez	-18.48	2.94	2.52	.51	.48
Ponce	5.87	2.99	.71	.52	.10
Stockton	11.49	.71	.11	.14	.85
Atlantic City	15.43	.62	-.07	.12	.96
Fall River	-9.54	.60	.36	.11	.78
Lowell	1.58	.56	.33	.11	.33
Fresno	20.66	.44	.35	.08	.97
New Bedford	-7.38	.31	.56	.06	.89
Scranton	-5.73	.83	.64	.16	.43
Huntington, Ashland	-.12	.58	1.01	.11	.56
Wheeling	-7.19	.57	.69	.11	.72
San Diego	31.53	1.16	.05	.22	.91
Altoona	-7.56	.88	1.32	.17	.61
Duluth, Superior	-4.42	.80	.54	.15	.54
Terre Haute	-.78	.59	.32	.11	.18
Wilkes-Barre, Hazleton	-11.62	.95	.88	.18	.68
Charleston (W. Va.)	-3.82	.54	.44	.10	.48
Lawrence, Haverhill	27.05	1.98	-.14	.38	.72
Spokane	6.13	.62	.25	.12	.73
Brockton	7.51	.38	.36	.07	.87
San Bernardino, Riverside, Ontario	39.74	.71	.27	.14	.98
Utica, Rome	4.52	.50	.53	.10	.68
Tacoma	8.19	.45	.34	.09	.85
Johnstown	-12.44	1.33	1.05	.25	.58
Jersey City b/	n.a.	n.a.	.44	n.a.	n.a.
Seattle	26.84	.62	-.06	.12	.96
South Bend	-13.27	1.19	1.18	.23	.66
Waterbury	-1.22	.48	.84	.09	.57
Springfield, Chicopee, Holyoke	4.57	.39	.45	.07	.73
Newark	3.34	.41	.46	.08	.63
Paterson, Clifton, Passaic	19.23	.43	.42	.08	.97
Providence, Pawtucket	2.56	.75	.80	.14	.43
Beaumont, Port Arthur	28.93	1.24	-.01	.24	.88
San Juan	22.34	2.02	1.05	.35	.68
Bridgeport	3.99	.57	.96	.11	.68
Philadelphia	6.63	.15	.12	.03	.97
Erie	-1.53	.48	.90	.09	.60
Hamilton, Middletown	6.00	1.01	.78	.19	.46
Kansas City	9.20	.68	.31	.13	.73

-continued-

Table B-1 (concluded)

Labor Market Area	Coefficient of t log(1+r) x 10^4		Coefficient of Log E (b)		R^2
	Coefficient	Standard error	Coefficient	Standard error	
Group 2 [a/]					
New Britain	-3.81	.57	.99	.11	.61
Worcester	-1.39	.36	.47	.07	.51
Buffalo	-.08	.54	1.04	.10	.60
Muskegon, Muskegon Heights	.61	.70	.86	.14	.39
Trenton	10.67	.34	.44	.06	.94
Syracuse	7.77	.44	.60	.08	.85
Corpus Christi	9.88	.63	.47	.12	.79
Pittsburgh	-6.67	1.86	.89	.36	.24
Asheville	15.39	.51	.75	.10	.94
Miami	41.17	1.49	-.06	.29	.91
Toledo	-2.53	.72	.75	.14	.39
Allentown, Bethlehem, Easton	3.89	.52	.46	.10	.57
Canton	-9.51	.55	1.31	.11	.84
Lorain, Elyria	5.88	1.09	1.59	.21	.58
Chattanooga	2.57	.41	.60	.08	.62
Evansville	-3.05	.86	1.34	.17	.51
Louisville	7.57	.48	.83	.09	.84
Detroit	-6.43	.60	1.49	.11	.77
Birmingham	6.31	.93	.36	.18	.43
Gary, Hammond, East Chicago	n.a.	n.a.	n.a.	n.a.	n.a.
Knoxville	3.19	.70	.76	.13	.49
York	5.68	.30	.60	.06	.89
Youngstown, Warren	-.61	1.05	.96	.20	.26
Saginaw	7.47	.78	.88	.15	.66
Flint	7.23	1.74	1.46	.33	.38

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a/ For definition of groups, see footnotes a and b, Table 3-1.

b/ Time series for entire period not available; coefficient of log E computed on basis of data for 1961-64.

n.a. Not available.

* U.S. GOVERNMENT PRINTING OFFICE: 1967--251-025/87